



Do Danish consumers prefer an organic vegetarian meal or a non-organic meaty alternative?

Evidence from a choice experiment

Christensen, Tove; Denver, Sigrid

Published in:
International Food Marketing Research Symposium

Publication date:
2018

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Christensen, T., & Denver, S. (2018). Do Danish consumers prefer an organic vegetarian meal or a non-organic meaty alternative? Evidence from a choice experiment. In *International Food Marketing Research Symposium : Conference Proceedings* (pp. 59-63) <http://instituteofpm.com/wp/proceedings/>



Conference Proceedings



**International Food Marketing Research Symposium
June 13-14, 2018
Bournemouth, UK**

Contents

In order of presentation

- Meredith Lawley & Aimee Riedel** “Channeling A Brand: Measuring The Effectiveness Of Communication Media Across Distribution Channels Over Time.”
- Sarah Joy Lyons & Themistoklis Altintzoglou** “Premium And Luxury: To Justify Or To Show Off?”
- Morten Heide & Svein Ottar Olsen** “Food Quality And Prestige-based Benefits For Consumer Segmentation.”
- Antonella Samoggia, Arianna Ruggeri & Bettina Riedel** “Innovative Coffee Marketing Strategies Exploring Social Media Perspectives On Coffee And Health.”
- Denise Conroy** “Trusting Your Gut: An Exploration Of Chinese Consumers’ Experiences Of Gut Health Issues In Relation To Food Consumption.”
- Jeffery Bray; F.J. Armando Perez-Cueto; Agnès Giboreau; Ioannis Mavridis; Heather Hartwell, Laure Saulais** “FoodSMART: Think Smart, Eat Smarter.”
- Thai Hong Le** “An Econometric Analysis Of Changing Dietary Trends And Its Implications For Health Around The World.”
- Sigrid Denver, Jonas Nordström, & Tove Christensen** “Increase In Organic Consumption And Dietary Health - A Dynamic Approach.”
- Andreas Lesny, Thomas Decker & Klaus Menrad** “Is Plastic Fruit Packaging Relevant To German Consumers?”
- Kristína Bednárová & Jiří Zelený** “The Use Of Technological Devices For Water Adjustment As A Product Innovation In Gastronomic Facilities.”
- Annesha Bernadette Makhil, Kirsten Robertson, Miranda Miroso & Maree Thyne** “Understanding The Socialisation Of Appearance-based Preferences For Fresh Fruit And Vegetables.”
- Kaisa Kivioja** “Olfactory Cues And Purchase Behavior In Food Products: The Category Approach.”
- Dawn Birch, Karen Brunso, Klaus G. Grunert, Juliet Memery, Temesi Ágoston & Zoltan Lakner** “Progress On The Revised Module Food-related Lifestyle Instrument (MFRL) – New Insights From Three Countries.”
- Tino Bech-Larsen & Gitte Lundberg Hansen** “The Unit Of Analysis In Household Food Surveys - A Wo/Man United?”
- Hanli De Beer** “What Food Product Developers Need To Know Beyond The New Prototype.”
- Tove Christensen & Sigrid Denver** “Do Danish Consumers Prefer An Organic Vegetarian Meal Or A Non-organic Meaty Alternative? Evidence From A Choice Experiment.”
- Thomas I. Wahl, James L. Seale, Jr. & Junfei Bai** “Chinese Urban Consumer’s Perception Of The Determinants Of Food Safety.”
- Gary W. Williams & Oral Capps, Jr.** “Generic Promotion Of Sorghum For Food And Industrial Uses In The United States.”
- Rachna Tewari, Joey Mehlhorn, Carmen Alamo Gonzalez & Franklin Roman Martinez** “Consumer Perspectives On The Senior Farmers’ Market Nutrition Program (SFMNP):

- Evidence From West Tennessee And Puerto Rico.”
- Garrett Harper, Joey Mehlhorn, Rachna Tewari & Ross Pruitt** “Understanding Farm To School Program Activity Among Private Schools In The Nashville MSA.”
- Stéphane Legendre, Deny Bélisle & Soumaya Cheikhrouhou**, “Food Claims For Certified Organic Food: A Canadian Field Study.”
- Andrew Baynham & Mike Von Massow** “The Effect Of Labelling Genetically Modified Products On Consumer Purchasing Behaviour.”
- Michael Von Massow & Jennifer Leslie**, “The Impact Of Local Labelling On Established Brands And New Entrants In The Condiment Category.”
- Dawn Birch, Kåre Skallerud & Nicholas Paul** “Drivers And Barriers Of Seaweed Consumption In Australia.”
- Chema Losada-Lopez, Paulino Montes-solla & J. Andres Faíña** “Game Theory And Edible Seaweed: Improving Information And Overcome Neophobia In Western Countries.”
- Merlin Uwalaka & Ellen Goddard** “Difference In The Evolution Of Risk Perception And Risk Attitudes Of Canadian Venison Consumers.”
- Marina Tomić, Damir Kovačić & Marija Cerjak** “Consumers’ Behaviour In Domestic Wine Purchase: A Field Experiment.”
- Hajar Mohamad, Miranda Miroso, Phil Bremer & Indrawati Oey** “A Focus Group Exploration Of Parents’ Commercial Weaning Food Purchase Intentions In Malaysia.”
- Verena Visse & Julian Allendorf** “E-commerce Is Booming? Not For Groceries! Identifying Ways To Reduce The Perceived Risk Related To Online Grocery Shopping.”
- M. Mar Serrano-Arcos, Raquel Sánchez-Fernández & Juan Carlos Pérez-Mesa** “The Role Of Consumer Affinity To Reduce Reluctance To Buy Foreign Food Products: The Case Of Spanish Vegetables Exportation.”
- Rosario Michel-Villarreal, Martin Hingley & Ilenia Bregoli** “Defining alternative food networks: A systematic literature review.”
- Michelle S. Segovia, Marco A. Palma, & Rodolfo M. Nayga** “How Does Episodic Future Interaction Affect Current Food Consumption?”
- Nina Bele, Suresh Ramanathan, Scott Davis & Claudia Jasmand** “Top Down, Side Up: Effects Of Food Architecture On Consumption Of Hedonic Foods.”
- Pernille N. Videbaek & Klaus G. Grunert** “From Disgusting To Delicious: Overcoming Barriers To Entomophagy Among Danish Consumers.”
- Justin Beneke** “Hue Do You Think You Are? Exploring The Influence Of Colour On Consumer Perceptions Of Brand Personality In The Context Of Renowned Food And Beverage Brands.”
- Birch, Dawn, Temesi, Agoston, Lakner, Zoltan, & Lawley, Meredith** “Consumers’ attitudes And Behaviours Associated With Food Waste: A Comparative Study Of Australia And Hungary.”
- Louise Randers, Susanne Pedersen, Birger Boutrup Jensen, George Tsalis & Jessica Aschemann-Witzel** “Motivation, Responsibility, Thriftiness And Frugality? Exploration Of Food Waste Reflections Among Deal Prone Danish Consumers.”
- Juliet Memery & Rob Angell** “Exploring Household Food Waste And Consumer Loss

Aversion.”

Isadora Stangherlin, Marcia Barcellos & Kenny Basso “The Impact Of Social Norms On Suboptimal Food Consumption: A Solution For Food Waste.”

Marija Banovic & Stine Mangaard Sarraf “To Shift Or Not To Shift: A Cross-cultural Study On Female Disposition To Substitute Meat And Dairy Protein In The Diet With Plant Protein Enriched Foods.”

Charlebois Sylvain “Cannabis-infused Food And Canadian Consumers’ Willingness To Consider “Recreational” Cannabis As A Food Ingredient.”

Brigitta Plasek, Zoltán Lakner, Gyula Kasza & Ágoston Temesi “Potential Of Functional Foods In Disease Prevention.”

Renee Hughner “Future Directions Pertaining To Food Security.”

M. Mar Serrano-arcos, Raquel Sánchez-fernández & Juan Carlos Pérez-mesa “Product-country Image And Crises In The Spanish Horticultural Sector”

Cerjak, M., Mesić, Ž., Tomić, M. “Millennials attitudes towards traditional cuisine in rural travel destination”

Svein Ottar Olsen, Kåre Skallerud, Morten Heide “Exploring Consumers’ Sensory Evaluation And Intention To Buy Salt-cured Clipfish”

Channeling A Brand: Measuring The Effectiveness Of Communication Media Across Distribution Channels Over Time

Professor Meredith Lawley & Aimee Riedel

Abstract

This research investigates which communication media (online, traditional or in-store) is the most effective at increasing purchase frequency across two distribution channels (supermarket and specialist stores) over the introduction and growth stages of a new industry branding strategy. A field study was conducted over a four-year period. Results indicate that at the brand introduction stage (year one), online media is the most effective at increasing purchase frequency but there are no differences in the effectiveness of different communication media channels for consumers who shop at supermarkets and specialist stores. However, in the growth stage (years three and four), nuanced differences in communication media effectiveness are evident across distribution channels. In year three, traditional advertising is more effective for supermarket shoppers while, in year four, a combination of traditional and online advertising is the most effective. For specialist store shoppers, online communication methods are the most effective across both years three and four. The current research therefore provides important insights into strategies to communicate with consumers who purchase from different distribution locations.

Purpose of the Research

The purpose of this research is to establish the communication media that is most effective for consumers who purchase at supermarkets and specialist stores in increasing brand purchase frequency across the introductory and growth stages of a brand.

Background/Motivation/Support

With the emergence and growing utilisation of new communication channels such as interactive online advertisements, it is important to gain an understanding as to their effectiveness when compared to traditional methods. Literature has provided initial insight into the effectiveness of online versus traditional communication media on outcomes such as brand loyalty, recruitment, message, product choice and willingness to recommend (Robert, 2013; Graham et al., 2008; Danaher, Wilson & Davis, 2003; Angulo-Ruiz, Pergelova, Cheben & Angulo-Altamirano, 2016). For instance, Graham et al. (2008) examined whether traditional communication approaches were more effective than online communication methods in increasing recruitment to smoking cessation interventions. It was identified that online advertisements recruited more participants than traditional methods. While, Danaher, Wilson and Davis (2003) utilised 19 grocery categories to identify that brand loyalty was higher for high market share brands purchased online whereas, offline brand loyalty was not related to brand share. These studies have provided the initial insight into the effectiveness of online versus traditional communication methods on a number of marketing outcomes, however, further research is required to investigate the effects on brand outcomes overtime. The need for further research is evident through there being little

understanding in the current literature as to different communication media effectiveness for a brand when it is first introduced to the market, and over time. This is important as approximately 80% of new businesses fail in their first year (Kocina, 2017) and as such, research is needed to identify how best to communicate with customers throughout this time. Therefore, the first aim of this research is to identify the effectiveness of traditional and online communication methods, over the introduction and growth stages of a brand.

Little research has also investigated whether consumers who purchase at different distribution locations such as supermarket and specialist stores, respond differently to traditional and online communication media. That is, whether different media platforms are more effective in increasing brand outcomes for consumers who purchase from supermarket or specialist stores. There is reason to believe that differences may be present as studies have identified personal variances in consumers who shop at these locations such as their motivations (Jacobs, van der Merwe, Lombard & Kruger, 2010). Therefore, the second aim of this study is to examine the effectiveness of different communication media across distribution channels in both the introductory and growth stage of a brand.

The current research will therefore add to the literature by identifying 1) the communication media which is most effective in producing the highest purchase frequency across the introductory and growth stages of a brand and 2) which communication media is the most effective for consumers who purchase at supermarkets and specialist stores in increasing brand purchase throughout the introductory and growth stages of a brand. This is achieved by examining the purchase frequency of a specialty brand, 'Love Australian Prawns' (LAP), throughout the introduction and growth stages. The communication methods that will be examined are online, traditional, in-store and none.

Methodology

A field study was conducted over four years. A new brand, 'Love Australian Prawns' (LAP) was launched in year one. Online (website and social media), traditional (public relations resulting in radio and television coverage and store catalogues) and in-store media channels were utilised to promote the brand. The brand logo and message were kept consistent across media promotion channels in year one. Two months after launch (introductory stage), a survey was administered through an online panel to evaluate the effectiveness of different promotional channels for consumers who shop at different distribution locations. 870 Australian residents were recruited who had purchased Australian prawns in the previous year. Survey questions involved demographics, selecting the media channels participants recalled seeing the LAP communication material in (traditional- radio, television and catalogue, online- social and website, and in-store), selecting the location they purchased prawns from (supermarket, specialist, combination) and a measure of brand appeal. Follow up surveys were administered in years three and four (growth stage) to assess brand effects longitudinally. The brand logo was kept consistent across these years. 843 and 815 participants completed the survey respectively in years three and four.

Findings

For year one, a 3x5 factorial ANCOVA was conducted to assess the effects of distribution channel (supermarket, specialist store, combination) and communication media (traditional, online, in-store, combination, none) on purchase frequency of a brand in its introductory stage controlling for age, gender and brand appeal. The results identified a significant effect of distribution channel, $F(2, 854) = 7.550, p = .001$, and communication media, $F(4, 854) = 2.818, p = .024$, on purchase frequency. These results suggest that consumers who shop at both supermarkets and specialist stores purchased the most frequently while, online communication media was the most effective at increasing purchase frequency. The two-way interaction between distribution channel and communication media on purchase frequency was also assessed. A non-significant interaction was identified, $F(6, 854) = 1.204, ns$. This indicates that there was no significant difference in effectiveness of communication media across purchase locations at the introductory stage.

For years three and four, 3x5 factorial ANCOVA's were again conducted utilising the same groups as year one. The results identified a significant effect of distribution channel, $F(2, 826) = 7.435, p = .001$, and communication media, $F(4, 826) = 3.930, p = .004$, on purchase frequency in year three and a significant effect of distribution channel, $F(2, 797) = 4.121, p = .017$, and communication media, $F(4, 797) = 7.468, p = .000$, on purchase frequency in year four. The results indicated that in the growth stage (across year three and four), purchase frequency was higher for consumers who shopped at both specialist and supermarket stores, and consumers who were exposed to online communication methods. This was consistent with year one. It was also identified that in-store communication was the second most effective communication media with it producing the second highest purchase frequency in year one and year four. Traditional communication was seen to not have high effectiveness, with it being only slightly more effective than when consumers were exposed to no communication. This finding was consistent with Angulo-Ruiz, Pergelova, Cheben and Angulo-Altamirano (2016) who identified that online communication was more effective than traditional advertising for increasing brand outcomes.

Table One. Means of Purchase Frequency Across Conditions

	Year One	Year Three	Year Four
Distribution Channel Main Effect			
Supermarket	3.736	3.782	4.096
Specialist	3.564	3.960	4.326
Both	4.141	4.241	5.048
Promotion Media Main Effect			
Traditional	3.736	3.832	3.896

Online	4.199	4.716	5.929
In-store	3.985	3.881	4.414
Combination	3.831	4.088	4.398
None	3.491	3.611	3.812
Distribution*Promotion			
Supermarket			
Traditional		4.178	3.621
Online		4.072	4.662
In-store		3.529	3.740
Combination		3.607	4.756
None		3.523	3.702
Specialist			
Traditional		3.615	3.550
Online		5.361	6.220
In-store		3.331	4.670
Combination		4.130	3.631
None		3.361	3.559
Combination			
Traditional		3.705	4.519
Online		-	6.905
In-store		4.783	4.831
Combination		4.528	4.808
None		3.950	4.175

*Bold signifying highest result

The two-way interaction between distribution channel and communication media on purchase frequency was assessed for the growth stage, years three and four. A significant interaction for purchase frequency was identified, $F(7, 826) = 2.100, p = .041$, for year three and four, $F(8, 797)$

= 1.966, $p = .048$. The means of all results can be seen in the table below. The results indicated that for consumers who shopped at supermarkets, traditional communication (M= 4.178) followed by online communication (M=4.072) were most effective at year three in increasing purchase frequency. However, at year four, the combination of online and traditional communication (M= 4.756), followed by online communication (M= 4.662) was the most effective. Interestingly, in-store communication (year three M= 3.529 and year four M= 3.740) across the growth stage period had similar effectiveness to no communication (year three M= 3.523 and year four M= 3.702). For consumers who shopped at specialist stores in the growth stage, online communication methods (year three M= 5.361 and year four M= 6.220) were identified as the most effective in increasing brand purchase frequency. Traditional communication (year three M= 3.615 and year four M= 3.550) was identified as having similar effectiveness to no communication (year three M= 3.361 and year four M= 3.559). These findings align with previous literature identifying that consumers who shop at different distribution channels, have different personal variances (Jacobs, van der Merwe, Lombard & Kruger, 2010). From the results, it is therefore evident, that different communication methods should be utilised for consumers who shop at different distribution locations throughout the growth stage of a brand.

Contributions to Theory and Practice

The results and findings collectively contribute to retail literature by examining the effectiveness of different communication methods across distribution channels over the first two stages of a brand cycle. Little previous research has bridged these two streams of research (communication media channel and distribution channel) together and examined their effectiveness throughout different stages of the brand cycle. The research has important key practical implications by identifying the communication media channel that should be utilised to communicate with different consumers who shop at supermarkets and specialist stores in the introductory and growth stages of a brand. This study was one of the first to examine these effects with a marketing campaign run in the real world.

Selected References

- Angulo-Ruiz, F., Pergelova, A., Cheben, J., & Angulo-Altamirano, E. (2016). A cross-country study of marketing effectiveness in high-credence services. *Journal of Business Research*, 69(9), 3636-3644. 10.1016/j.jbusres.2016.03.024
- Danaher, P. J., Wilson, I. W., & Davis, R. A. (2003). A comparison of online and offline consumer brand loyalty. *Marketing Science*, 22(4), 461-476. 10.1287/mksc.22.4.461.24907
- Graham, A. L., Milner, P., Saul, J. E., & Pfaff, L. (2008). Online advertising as a public health and recruitment tool: Comparison of different media campaigns to increase demand for smoking cessation interventions. *Journal of Medical Internet Research*, 10(5), e50. 10.2196/jmir.1001
- Jacobs, S., van der Merwe, D., Lombard, E., & Kruger, N. (2010). Exploring consumers' preferences with regard to department and specialist food stores. *International Journal of Consumer Studies*, 34(2), 169-178. 10.1111/j.1470-6431.2009.00844.x
- Kocina, L. (2017). What percentage of new products fail and why? Retrieved from

<https://www.publicity.com/marketsmart-newsletters/percentage-new-products-fail/>
Roberts, C. (2013). A functional analysis comparison of web-only advertisements and traditional television advertisements from the 2004 and 2008 presidential campaigns. *Journalism & Mass Communication Quarterly*, 90(1), 23-38. 10.1177/1077699012468741

Premium and luxury: To justify or to show off?

Sarah Joy Lyons & Themistoklis Altintzoglou

Abstract

The study aims to show how the labels premium versus luxury in combination with the functional, individual, and symbolic values they offer can influence the purchase justification, willingness to buy, need to explain, and desire to show off.

Premium and luxury products belong to the higher reaches of the hedonic spectrum and both constructs may be perceived in terms of the individual, functional, and symbolic values they offer. The presented research builds on a three-dimensional value framework to assess the willingness to buy, the purchase justification, the desire to show off, and the need to explain premium versus luxury.

A Linguistic Inquiry and Word Count (LIWC) analysis allowed the participants to define luxury and premium. In a between-subject 2x3 online experiment, we then investigated how consumers react when framed to buy premium versus luxury, and suggest that these labels, in combination with the framing of their individual, functional, or symbolic values, may influence the justification, willingness to buy, need to explain, and desire to show off.

The study confirms that the label premium is easier to justify and thus triggers a higher willingness to buy. However, an interaction effect between value and label suggests how consumers want to show off and explain premium and luxury purchases to others.

The theoretical implications of this study arise from the insight it provides into how consumers use value and labels to justify premium and luxury products to themselves and others. Practical implications on how to support consumers in making well-justified purchase decisions are also discussed.

- a. Corresponding author preferred contact details

Food Quality and Prestige-Based Benefits for Consumer Segmentation

Morten Heide & Svein Ottar Olsen

Abstract

The main aim of this study is to identify consumer segments based on the importance of food quality and prestige benefits when buying food for a special occasion, dinner party with friends. Consumer benefits, which are the desires, preferences or expectations that consumers seek to fulfil when purchasing or consuming a product, have been suggested as one of the most important means of identifying different consumer food segments. The importance that consumers attribute to different product benefits is an indication of the motives underlying their product choices.

Using cluster analysis, the importance of food quality benefits and prestige benefits are investigated. The resulting segments are validated against the survey responses regarding the individual characteristics of consumers. Four distinct consumer segments based on 20 different food quality and prestige benefits are identified.

This study confirms that food quality benefits like taste and health of food are the foremost perceived benefits across consumer segments, and that such benefits are important and necessary for all consumers. This study suggest some important differences between Premium consumers, looking for food quality and hedonic benefits, and Luxury seeking, with a relatively higher focus on prestige quality, uniqueness and social benefits. This study also identifies a significant distinction between Perfectionists and Value focused consumers. Both segments are focused on food quality benefits but differ in their focus on value and prestige benefits.

This paper can serve as a base for developing group oriented marketing strategies in food markets, especially for premium and luxury food products

(a) Corresponding author preferred contact details

Innovative coffee marketing strategies exploring social media perspectives on coffee and health

Antonella Samoggia*, Arianna Ruggeri

Abstract

The attention of marketers and consumers towards healthy food and beverages is growing. Coffee is one of the most common beverages worldwide. Currently, there is an open and lively political, scientific and industrial debate on the health effects of coffee. Social media are a source of information about consumers' perception. The paper aims at investigating Twitter platform content towards health attributes of coffee to explore innovative coffee marketing trends and opportunities. The paper also tests how Twitter can be effectively used as a global focus group, to explore market trends and consumers' perception.

A sample of tweets was collected on a daily basis for one month in mid-2017. The search included a sample of tweets including the key words *coffee* and *health*. Messages were categorized with a term frequency analysis including an hashtag analysis consolidated with the support of a key-word in context analysis. A sentiment analysis of tweets was implemented to assess their positive or negative content perception.

Tweets focusing on coffee and health are around 13,000. There are around 4,800 users that mentioned health and coffee in their tweets. The most visible users mentioning the link between coffee and health are the media, whereas the most active users are single persons, closely followed by media. The sentiment analysis results show that the majority of tweets is neutral or slightly positive. There are many indifferent, but also many positively inclined messages towards the potential positive effects of coffee. Therefore, coffee has the potential to be positioned in consumers' mind for its health benefits.

Trusting your gut: an exploration of Chinese consumers' experiences of gut health issues in relation to food consumption.

Denise M Conroy and Jenny Young

Abstract

Introduction

The New Zealand Government funds a series of National Science Challenges to research areas which it has determined will be economically beneficial to New Zealand's economy. One such Challenge is "High Value Nutrition" (HVN), a project to develop new functional foods and supplements using ingredients sourced from New Zealand's primary industries which will be attractive to the Chinese consumer. Given New Zealand's geographical location, China is a crucial export market for New Zealand.

The HVN Challenge determined that a crucial starting point for this 9 year research programme was a deep and rich understanding of consumer insights. China is a rapidly developing economy, and changes in consumption, including food consumption, are leading to major social issues. The rapid increases in metabolic diseases such as overweight and obesity, and the dramatic increases in type 2 diabetes are well documented (Gordon-Larsen, Wang, & Popkin, 2014), and a significant increase in gut health issues such as Irritable Bowel Syndrome is also occurring (Li and Li, 2015). To understand the dynamics surrounding Chinese consumers changing food consumption habits, we must firstly understand the consumption context and what influences consumption behaviour.

This research is interested in how changing food consumption is negatively contributing to health in China, and specifically how consumer trust in the Chinese food industry is playing a large role in this. In this paper we use the context of 'gut health' to explore these issues. Our aim is to better understand Chinese consumers' attitudes, values, lived experiences, culture and emotions including their understanding of the links between their food choices and their gut health. Our overall research purpose is to provide valuable consumer insights to New Zealand industry who are interested in designing products to contribute to the better health of Chinese consumers.

A brief (recent) history of China

Firstly we briefly discuss the history of China, and acknowledge how its past struggles have shaped the ways of modern consumption.

Over the period 1958-1976, the establishment of The People's Republic of China and the Cultural Revolution led by Mao Zedong steered China into one of its darkest times in history.

Extreme famine, millions of deaths, lack of education and a crippled economy characterised the period. After Mao's death in 1976, the Cultural Revolution officially came to an end, and China started its journey toward economic reforms and openness. Part of this included allowing foreign investment into certain areas of the country under a more capitalist system. This strategy led to the rapid growth of China's economy, improvements in living standards and the creation of an urban middle class. Becoming increasingly comfortable with a consumption-based culture, China's spending is now 43% higher than five years ago (Bali, 2018).

As China modernised, Western styles of consumption and their unhealthy eating habits, became easier to access (Zhai et al., 2014). With China's past struggles still fresh in the minds of the older generations and an increased access to food, the recent generations have almost been 'force fed', with fatter children being seen as healthier and stronger, and more expensive foreign food and meats seen as better (Jingxiong et al., 2007). As a result, China has experienced dramatic dietary changes, with a shift from more plant-based diets to predominantly consuming animal-products (Lam, Remais, Fung, Xu, & Sun, 2013). Although this cannot necessarily be blamed on fast-food and sugars, the consumption of oils, animal products, and fats have all rapidly increased while physical activity decreased (Popkin, 2008). Chinese are now facing an obesity epidemic and the ensuing diseases (Gordon-Larsen, Wang, & Popkin, 2014; Y. Wang, Mi, Shan, Wang, & Ge, 2007).

Methodological Framework

In this work Assemblage is applied as a methodological framework (i.e. Brenner, Madden, & Wachsmuth, 2011) to explore social and behavioural change towards better health in China. Building on actor-network theory (ANT), this perspective is "a disparate family of material-semiotic tools, sensibilities and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located." (Law, 2009). Applying this perspective to consumption, it questions the assumptions and concepts traditionally found in consumer culture research, showing them to be more fragile and interdependent than is often acknowledged (Canniford & Bajde, 2016). It is argued that assemblages can illuminate previously overlooked aspects of markets and consumption by broadening the research gaze, and prevent a premature closing off of discussion, by acknowledging the intertwined nature of the social and natural (Bajde, 2013; Canniford & Bajde, 2016). Canniford and Bajde (2016), further explain that assemblages can help marketers to explore how many forces in markets can influence its changing nature/assemblages, and how new assemblages can be created through steps taken by different actors. However, they state marketers need to be aware of the political nature of assemblages, they are a part of the assemblages with consumers, particularly when trying to create change, and must consider the role marketers and researchers play in consumption assemblages.

These ideas are useful to this research. In investigating the changing dietary consumption of Chinese consumers, a myriad of actants influences their shift from local goods to foreign brands and manufacturers. Taking an assemblage perspective allows us to explore the complex

dynamics at play in this market and conduct research at different levels of inquiry, i.e. products, consumers, and industry experts. Taking a processual approach can also be beneficial when investigating consumer change in sociocultural contexts (Giesler & Thompson, 2016).

Method

We began by conducting 4 focus groups. 2 focus groups consisted of participants from the younger generation (25-40 years), and 2 focus groups consisted of participants from the older generation (41- 56 years). The different age ranges reflect the fact that the two generations have been differently educated and the younger generation have had significantly greater exposure to the West than have the older generation. A mix of males and females were interviewed. All interviews were conducted in Chinese; the New Zealand researcher was in the room with a simultaneous translator. Interviews were then transcribed, translated into English and this translation was double checked by a researcher fluent in both English and Chinese.

In the second phase of the research we interviewed 12 participants in their own homes. Again we selected 6 participants in each of the age ranges. Each participant had been identified as suffering with the general diagnosis of IBS. In addition to the interview, observations were conducted on the types of foods in their refrigerators and cupboards, and any supplements they were regularly taking. All participants were from a higher middle class demographic. Again, all interviews were conducted in Chinese; the New Zealand researcher was in the room with a simultaneous translator. Interviews were then transcribed, translated into English and this translation was double checked by a researcher fluent in both English and Chinese.

Discussion of Main Findings - Food Safety and Trust

In general, our participants had a reasonable understanding of the links between their food intake and their gut issues. However, the majority reported some version of '*cannot control my mouth*' P3. All participants were looking for food products and/or supplements that were convenient, simple and would resolve symptoms. Cost was not an issue for our Participants. For the HVN project, perhaps the most interesting theme to emerge was "Food Safety & Trust".

In recent years China has been hit by multiple food safety scandals that have rocked consumers' confidence and trust in their national food industry (Chen, 2013; Roberts, 2011). With a history of poverty, disciplined spending and increasing market pressures, Chinese food companies began to replace cheaper substitutes for approved ingredients (Pagnattaro & Peirce, 2010). The most notorious of these food incidents was the melamine-tainted baby formula in 2009 that caused the death of multiple infants and harmed hundreds of thousands more (C. Liu, 2009). Despite the Chinese government trying to introduce more stringent food safety and quality regulations to prevent food adulteration, food safety disasters continued to happen (C. Liu, 2009; Roberts, 2011). The repeating of such incidents has been blamed on a lack of transparency in the governing of food safety and quality (Mol, 2014). Due to such breaches of confidence, China

tends to be a low-trust society compared to the West, making it a highly interesting setting for studying trust in food (Chen, 2013).

The concept of trust is conceptualised in many diverse ways among different disciplines (Rousseau, Sitkin, Burt, & Camerer, 1998). Rousseau et al. (1998), find that the critical themes common to many definitions of trust tend to be expectations and ‘a willingness to be vulnerable’ toward another party. In congruence with assemblage thinking, McKnight and Chervany (2001) view the different disciplinary conceptualisations of trust as three interrelated processes. They view one’s disposition to trust (psychology) as influencing their trust in social situations and institutions (sociology), further impacting one’s trusting beliefs and intentions (economics) which shape their trust in a specific object or party (McKnight & Chervany, 2001). Chen (2013) in studying Chinese consumers’ perceptions of food safety, similarly distinguishes trust into general trust, industry-level specific trust (i.e. government) and supplier-level trust (i.e. manufacturers). He found both trust in general and in the government influence trust in manufacturers, which in turn relates directly to food safety perceptions (Chen, 2013). Thus trust appears to be interrelated at different levels. This paper is mainly interested in how people feel and experience trust, specifically regarding food safety.

In light of these issues, food safety moved to the top of the list of issues that Chinese people are most concerned about (FORHEAD, 2014). Chinese consumers simultaneously distrust both food- safety regulation and the industrial-scale food producers (R. Liu, Pieniak, & Verbeke, 2014), who are believed to put profits ahead of consumer safety (Chen, 2013), and not guarantee food safety (Zhang, Xu, Oosterveer, & Mol, 2016). Lam et al. (2013) further explain that in addition to food being a basic survival need, it is also now perceived as a commercial commodity for profit making, where food producers and manufacturers engage in illegal actions to get more profit, jeopardising the public’s trust in food safety. Thus, consumers tend to be most worried about counterfeit and inferior quality food from Chinese producers (R. Liu et al., 2014).

Our participants all echoed these concerns. They strongly feel that there is corruption throughout the supply chain, and no domestic products can be trusted. They are highly sceptical of foreign brands which are sold in local owned stores – believing that these products are unlikely to be authentic. They have more trust in foreign brands in foreign owned stores, but strongly prefer to purchase either on-line directly from a foreign country, or via a trusted intermediary.

We suggest that the transitioning economy and the diminishing trust in the domestic food supply may have together helped fuel Chinese consumers’ dietary shifts. Knight, Gao, Garrett and Deans (2008) explain that the low social trust in China has been amplified by the food scandals, with this mistrust mostly contained within China’s borders, international brands are seen as of higher quality and safer. As such, imported food products tend to enjoy a higher reputation than both domestic products and foreign brands that are domestically produced (Knight et al., 2008). Yin et al. (2016) also found evidence that Chinese consumers trust the most well-known brand.

Conclusion

We propose that Chinese consumers' trust in international brands is fuelled by their mistrust in Chinese food products. However, this trust in international food products may come at the expense of consumers' health. Although the foreign foods may be safer, a modern-Western diet is not necessarily healthier than the traditional Chinese diet, which can be seen by rising food-related health issues typically seen in the West (Gordon-Larsen et al., 2014). Thus we argue, that consumers mistrust in Chinese food production creates an immense barrier to their eating healthier domestic foods. Until trust is established at all levels of China's food chain, even healthier food options such as organic produce are unlikely to be trusted (R. Wang, Si, Ng, & Scott, 2015).

For New Zealand and the HVN project, this lack of trust in domestic brands presents an important opportunity. Concerns with health in general, and gut health in particular is strong, and consumers are actively seeking functional food products and supplements which will relieve their symptoms –and they would like these to be manufactured and sourced from overseas. Our participants were very complimentary of New Zealand's image, and trusting of New Zealand's safety standards. Consequently they reported being very open to purchasing foods from New Zealand.

To further build towards our assemblage, research is continuing involving other market actors, including interviews with Chinese medical authorities, and workshops with New Zealand food industry producers, manufacturers, processors and marketers.

Supported by funding received from the National Science Challenge "High Value Nutrition"

References

- Bajde, D. (2013). Consumer culture theory (re)visits actor–network theory: Flattening consumption studies. *Marketing Theory*, 13(2), 227–242. <https://doi.org/10.1177/1470593113477887>
- Bali, V. (2018, February 1). 5 things we can learn from China's e-commerce explosion. Retrieved 22 February 2018, from <http://www.nielsen.com/cn/en/insights/news/2018/5-things-we-can-learn-from-chinas-e-commerce-explosion>
- Brenner, N., Madden, D. J., & Wachsmuth, D. (2011). Assemblage urbanism and the challenges of critical urban theory. *City*, 15(2), 225–240. <https://doi.org/10.1080/13604813.2011.568717>
- Canniford, R., & Bajde, D. (2016). Assembling consumption introduction. In *Assembling consumption: Researching actors, networks and markets* (pp. 1–18). New York, NY: Routledge.

Chen, W. (2013). The effects of different types of trust on consumer perceptions of food safety: An empirical study of consumers in Beijing Municipality, China. *China Agricultural Economic Review*, 5(1), 43–65. <https://doi.org/10.1108/17561371311294757>

FORHEAD. (2014). *Food safety in China: A mapping of problems, governance and research* (pp. 1–83). New York: Forum on Health, Environment and Development (FORHEAD). Retrieved from <http://webarchive.ssrc.org/cehi/PDFs/Food-Safety-in-China-Web.pdf>

Giesler, M., & Thompson, C. J. (2016). A tutorial in consumer research: Process theorization in cultural consumer research. *Journal of Consumer Research*, 43(4), 497–508. <https://doi.org/10.1093/jcr/ucw047>

Gordon-Larsen, P., Wang, H., & Popkin, B. M. (2014). Overweight dynamics in Chinese children and adults. *Obesity Reviews*, 15(S1), 37–48. <https://doi.org/10.1111/obr.12121>

Jingxiong, J., Rosenqvist, U., Huishan, W., Greiner, T., Guangli, L., & Sarkadi, A. (2007). Influence of grandparents on eating behaviors of young children in Chinese three-generation families. *Appetite*, 48(3), 377–383.

Knight, J., Gao, H., Garrett, T., & Deans, K. (2008). Quest for social safety in imported foods in China: Gatekeeper perceptions. *Appetite*, 50(1), 146–157. <https://doi.org/10.1016/j.appet.2007.06.010>

Lam, H.-M., Remais, J., Fung, M.-C., Xu, L., & Sun, S. S.-M. (2013). Food supply and food safety issues in China. *The Lancet*, 381(9882), 2044–2053. [https://doi.org/10.1016/S0140-6736\(13\)60776-X](https://doi.org/10.1016/S0140-6736(13)60776-X)

Law, J. (2009). Actor network theory and material semiotics. In B. S. Turner (Ed.), *The New Blackwell Companion to Social Theory* (pp. 141–158). Malden, USA: Wiley-Blackwell.

Li, C-Y., and Li S-C. (2015). Treatment of irritable bowel syndrome in China: A review. *World Journal of Gastroenterology*. Feb 28; 21(8): 2315–2322

Liu, C. (2009). Profits above the Law: China's Melamine Tainted Milk Incident. *Mississippi Law Journal*, 79, 371–418.

Liu, R., Pieniak, Z., & Verbeke, W. (2014). Food-related hazards in China: Consumers' perceptions of risk and trust in information sources. *Food Control*, 46, 291–298. <https://doi.org/10.1016/j.foodcont.2014.05.033>

McKnight, D. H., & Chervany, N. L. (2001). What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *International Journal of Electronic Commerce*, 6(2), 35–59. <https://doi.org/10.1080/10864415.2001.11044235>

Pagnattaro, M. A., & Peirce, E. (2010). *If I eat this will it kill me? An analysis of China's new foodsafety law and other protections to regulate food produced in China*. Unpublished Paper, University of Georgia. Retrieved from https://works.bepress.com/marisa_pagnattaro/

Popkin, B. M. (2008). Will China's Nutrition Transition Overwhelm Its Health Care System And Slow Economic Growth? *Health Affairs*, 27(4), 1064–1076. <https://doi.org/10.1377/hlthaff.27.4.1064>

Roberts, M. T. (2011). A perspective on emerging law, consumer trust and social responsibility in China's food sector: The bleaching case study. *Food & Drug LJ*, 66(3), 405–415.

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *The Academy of Management Review*, 23(3), 393–404.

Wang, R., Si, Z., Ng, C., & Scott, S. (2015). The transformation of trust in China's alternative food networks: disruption, reconstruction, and development. *Ecology and Society*, 20(2). <https://doi.org/10.5751/ES-07536-200219>

Wang, Y., Mi, J., Shan, X. —, Wang, Q. J., & Ge, K. —. (2007). Is China facing an obesity epidemic and the consequences? The trends in obesity and chronic disease in China. *International Journal of Obesity*, 31(1), 177–188. <https://doi.org/10.1038/sj.ijo.0803354>

Yin, S., Chen, M., Chen, Y., Xu, Y., Zou, Z., & Wang, Y. (2016). Consumer trust in organic milk of different brands: the role of Chinese organic label. *British Food Journal*, 118(7), 1769–1782. <https://doi.org/10.1108/BFJ-11-2015-0449>

Zhai, F. Y., Du, S. F., Wang, Z. H., Zhang, J. G., Du, W. W., & Popkin, B. M. (2014). Dynamics of the Chinese diet and the role of urbanicity, 1991–2011. *Obesity Reviews*, 15(S1), 16–26. <https://doi.org/10.1111/obr.12124>

Zhang, L., Xu, Y., Oosterveer, P., & Mol, A. P. J. (2016). Consumer trust in different food provisioning schemes: evidence from Beijing, China. *Journal of Cleaner Production*, 134, 269–279.

FoodSMART: Think Smart, Eat Smarter

Jeffery Bray; F.J. Armando Perez-Cueto; Agnès Giboreau; Ioannis Mavridis; Heather Hartwell,
Laure Saulais

Abstract

Introduction

Eating out has become an integral part of modern life for many people; it is thought that one in six meals are now consumed out of the home in restaurants, cafés or workplace canteens in the EU^{1,2}. Compared to meals prepared at home, the consumer often has very little control or knowledge of the ingredients, their provenance or nutritional profile. In fact, meals eaten out tend to contain more calories and fat³, and there is a positive association between the rise in eating out and increasing rates of obesity, which is fast becoming a major health and wellbeing societal challenge in many Western nations⁴.

Perhaps due to increased media coverage of health issues, consumers have become more health conscious and are increasingly taking greater interest in the healthiness of their food choices⁵. Linked to this, consumers are increasingly seeking more information about the foods that they buy⁶.

To be effective, information must be concise and simple⁷, and not only be reliable, accurate and complete, but importantly communicated in a clear manner in an individualised way⁸. Currently, most information provision on food offered in an eating out setting is delivered on a printed menu. This medium has, however, only limited space beyond a pure description of the dishes offered for nutritional or other enhanced information to be provided⁹. The physical limitations of a printed menu render it impossible to deliver personalised health messages that each consumer would like to receive in a clear and simple manner.

A number of recent studies have highlighted the potential that technology based applications may hold in providing detailed but clear individualised information⁹⁻¹¹. Through utilising web or mobile application based methods, the data provided can be tailored to the user¹² and can promote greater engagement through interactivity¹³. The potential of such web based solutions is being enabled by the rapidly growing numbers of smart phone users, with such technology estimated to have a 66.5% penetration in North America, 67.3% in Western Europe by 2018 and 36.5% globally by 2018¹⁴.

A small number of smart phone applications have been developed and marketed to provide consumers with enhanced food information¹⁵, examples of these include ‘Tapingo’ which enable university students to order food from their canteen¹⁶, and ‘SmartAPPetite’ which encourages people to eat local and healthy food¹⁷. Nevertheless, no research has been undertaken to understand consumer interest in such initiatives, likely adoption rates or what features such tools might incorporate, a knowledge gap this study aims to fill.

Methodology

A group-based approach was adopted through focused group discussions, designed and moderated along established guidelines.

Participants were selected using a convenience sampling technique for ease of access and purposive sampling in order to reach the specific group of interest. Four focus groups were conducted in the United Kingdom, two with staff from large companies who had access to, and regularly used (at least twice a week on average), a work place canteen, and a further two with students who accessed on-campus food service. The research was not limited to their dining in the work/study place canteen, and also considered other out of home dining experiences such as restaurants or fast-food outlets. Focus groups contained between six and eight participants each, 50% females, with a total sample of 28 diners' views being explored.

Since it is well documented that technology adoption varies between generational cohorts¹⁸, each focus group included participants of similar ages providing a degree of commonality in terms of technological experiences within each group. Participants between the ages of 18 and 60 participated in the study, representing a broad age range of consumers who are eating out frequently in a wide range of settings.

Each participant gave informed consent prior to the commencement of the focus group discussions and ethical approval was granted prior to data collection. Anonymity was assured throughout the study and pseudonyms used where data is presented. After preliminary analysis of the four focus groups theoretical saturation had been reached.

An experienced moderator convened each discussion guide and was joined by a trained observer, who was impartial to the research. The observer monitored the group discussions to ensure that all aspects were being addressed and to interject if they observed any group member's contribution had been missed. To ensure that each group discussion followed a singular structure and addressed the same key objectives, the same moderator and observers conducted each group, and a structured discussion guide was compiled with a broad, open-ended questioning route and prompts. This discussion guide was pre-tested with a small number of one-to-one interviews prior to use to ensure that the parlance was clear, wording used was grounded in the consumers own vocabulary, and initiated a free discussion. The discussion was allowed to freely develop to ensure that all possible ideas could emerge and be discussed. Moderator involvement was kept to a minimum to ensure that discussions progressed freely without unnecessary intervention. Each group discussion was around one hour in length.

Discussions were recorded and transcribed verbatim, including notes on tonality, hesitation and intonation. The data were formatted, and coded manually within the NVivo software package using open and axial coding¹⁹ to develop a template of emergent factors²⁰, which was refined through iterative coding and recoding to ensure robustness of the findings.

Findings

Key themes emerged reflecting participants' attitudes towards current uses of technology in eating out, and future technological applications.

Current technology use

There was a clear frustration expressed in each discussion group around the inability to understand the nature and properties of dishes when eating out, with the lack of sufficient information about dish ingredients, nutrients and preparatory methods being discussed. For some consumers there is a general desire to understand more about what they are eating, whilst others had particular dietary requirements such as Vegetarian or Gluten Free, and experienced difficulties informing such choices.

Through discussion a wide range of ICT functionality used to support participants eating out practices were identified. The participants described smartphones as the platform for most of their technical engagement relating to eating in this setting.

However, information given currently stops well short of that sought by the participants and does not assist the customer to gain factual dish level information around the composition of dishes from a nutrient and allergenic perspective or further detail regarding for example provenance of ingredients.

Future technologies

Given the current widespread use of technology by participants, avenues for future potential usage were identified. The concept of using a smartphone app to access an establishment's menu and gain enhanced dish information in a personalised manner was discussed in all groups. Most participants expressed enthusiasm toward the use of such an app and suggested that they would keenly engage with such a technological solution, at least some of the time. It was thought to be of particular use to people who were trying to control their eating, and for those diners who may have allergies, intolerances or specific dietary preferences, such as vegetarianism.

The idea of the consumer gaining control over what they were eating was felt strongly by some participants, and it became clear that they would trust information provided in such a manner more, rather than that provided by staff.

Through discussion, the notion that information provided could be tailored to each consumer providing only that of interest was outlined. Through this, it was thought that such detail might make it quicker for diners to be able to identify dishes that meet their dietary requirements and preferences and avoid the concerns that have been highlighted by previous studies around consumers receiving 'information overload'. The need for the personalised provision of information was very clear to a number of participants.

Discussion

This study has shown that consumers are aware of the need to consider the constituents and nature of the food that we eat, and many have a keen interest in learning more about what they consume. This confirms the findings of previous studies, which have also commented on growing awareness and interest in information on food eaten out of the home²¹. It is notable, however, that the level of interest is not equal for all consumers. Some considered a fundamental right to know what they are eating, mirroring the thoughts of Mazurkiewicz-Pizo and Pachuca-Smulka⁸, while others suggested that they would rather not know or be informed, and the

presence of nutritional information could even dissuade them from dining in a particular venue altogether.

For those who are keenly interested in the composition and properties of the food they consume there is currently frustration when information is not available. These consumers have spoken of a need to access detailed dish information in order to gain control and trust in what they are eating. The role of trust in food is mainly influenced by humanistic understandings of trust²² and can be categorised as interpersonal trust between individuals and institutions²³. Past food scares and malpractices in the food system have adversely affected the extent to which consumers trust the food they eat²⁴, encouraging the consumer to take a more active control over making more informed choices. Consumers do not only value the literal message of food information; menu labelling is a key communication tool between foodservice operator and consumers. Hereby, consumers make judgements about the trustworthiness of the food operator²⁵ in the absence of face-to-face contact²⁶.

In parallel with other studies⁹⁻¹¹, the research conducted here has highlighted that not all consumers wish to receive the same information. Consequently, for information to influence actions, it must be relevant and salient to each individual consumer. Through this study, it has emerged that the required customisation of information provision could be most effectively facilitated through personal ICT solutions. The concept of using a smartphone application to access personalised information was viewed positively by many participants.

Conclusions

From this research, it is evident that there is a clear need from both a health and consumer choice perspective for industry to improve information provision within the eating out context. The topic is gaining momentum and currency, although research in the area is currently in its infancy. This study provides interesting insights which can be realistically and viably accomplished by operators providing clear consumer benefits and thus competitive advantage for leading players.

It is argued that electronic provision is most suited to meeting the challenges of providing relevant and salient food information to each individual consumer. Participants in this research demonstrate a clear willingness and desire to embrace such provision provided that it was customized to their own individual needs. Further research is called for to demonstrate generalizability of the concepts to a wider population. Notwithstanding, the potential impact of practical advances in this field are broad, not only influencing consumers enjoyment, sense of control and trust but also helping the sector to improve accountability and transparency of food provision.

Note: a demonstration of the prototype app will be given during the presentation

References

1. Benelam B. Calories on the menu. *Nutrition Bulletin* 2009;34:289-290

2. Mikkelsen BE. Images of foodscapes: introduction to foodscape studies and their application in the study of healthy eating out-of-home environments. *Perspectives in Public Health* 2011;131:209-216
3. Bohm E, Quartuccio N. Healthy Dining Restaurant Nutrition Program – a winning recipe for consumers, dietitians and restaurants. *Journal of the American Dietetic Association* 2008;108:A112
4. Bezerra I, Curioni C, Sichieri R. Association between eating out of home and body weight. *Nutrition Reviews* 2012;70:65-79
5. JungJin H, Cranage D. Customer heather perceptions of selected fast-food restaurants according to their nutritional knowledge and health consciousness. *Journal of Foodservice Business Research* 2010;13:68-84
6. Lusk JL, Marette S. Can labeling and information policies harm consumers? *Journal of Agricultural & Food Industrial Organization* 2012;10
7. Van Rijswijk W, Frewer LJ. Consumer needs and requirements for food and ingredient traceability information. *International Journal of Consumer Studies* 2012;36:282-290
8. Mazurkiewicz-Pizo A, Pachuca-Smulska B. Access to information as a determinant of the consumer behavior at the food market. *Acta Scientiarum Polonorum – Oeconomia* 2012;11:35-46
9. Chan C, Kam B, Coulthard D, Pereira S, Button P. Food product information: Trusted sources and delivery media. In: Proceedings of the 24th Australasian Conference on Information Systems – ACIS (pp 1-13). Melbourne: RMIT, 2013
10. Price S, Hartwell H, Hemmingway A, Chapleo C. Workplace foodservice: perception of quality and trust. *Appetite* 2016;97:169-175
11. Lowe B, Fraser I, Souza-Monteiro DM. A Change for the better? digital health technologies and changing food consumption behaviors. *Psychology & Marketing* 2015;32:585-600
12. Kalnikaite V, Bird J, Rogers Y. Decision-making in the aisles: informing, overwhelming or nudging supermarket shoppers? *Personal and Ubiquitous Computing* 2012;17:1247-1259
13. Valdivieso-López E, Flores-Mateo G, Molina-Gómez JD, Rey-Reñones C, Barrera Uriarte ML, Duch J et al. Efficacy of a mobile application for smoking cessation in young people: study protocol for a clustered, randomized trial. *BMC Public Health* 2013;13:704-704
14. Statista. Smartphone penetration per capital in North America since 2000. London: Statista, 2015. Available at: <http://www.statista.com/statistics/203713/smartphone-penetration-per-capita-in-north-america-since-2000/> (accessed 12 June 16)
15. Hee-Sun K. A Study on personalized information service based on smart phone. *International Journal of Advancements in Computing Technology* 2013;5:470
16. Barfield J. Food service app allows students to order meals with smartphones, avoid long lines, 2014. Available at: <http://search.ebscohost.com/login.aspx?direct=true&db=edsnbk&AN=150215B3564B69A8&site=eds-live&scope=site> (accessed 25 April 2016).

17. SmartAPPetite. SmartAPPetite: Buy Local, Eat Smart, Get Healthy. Canada, 2015. Available at: www.smartappetite.ca (accessed 25 April 2016)
18. Yang K, Jolly LD. Age cohort analysis in adoption of mobile data services: gen Xers versus baby boomers. *Journal of Consumer Marketing* 2008;25:272-280
19. Crabtree BF, Miller WL. Using codes and code manuals: a template organizing style of interpretation. In: Crabtree BF, Miller WL, editors. *Doing qualitative research* (pp 163-177). California: Sage, 1999
20. King N. Using templates in the thematic analysis of text. In: Cassell C, Symon G, editors. *Essential guide to qualitative methods in organizational research* (pp 256-270). London: Sage, 2004
21. Banterle A, Cavaliere A, Ricci EC. Food labelled information: an empirical analysis of consumer preferences. *International Journal on Food System Dynamics* 2012;3:156-170
22. Salvatore A, Sassatelli R. Trust and food: a theoretical discussion. Working paper (pp 2-50). Bologna: University of Bologna, 2004
23. Meyer S, Ward P, Coveney J, Rogers W. Trust in the health system: an analysis and extension of the social theories of Giddens and Luhmann. *Health Sociology Review* 2008;17:177-186
24. Coveney J. Food and trust in Australia: building a picture. *Public Health Nutrition* 2008;11:237-245
25. Tonkin E, Wilson AM, Coveney J, Webb T, Meyer SB. Trust in and through labelling – a systematic review and critique. *British Food Journal* 2015;117:318-338
26. Giddens A. Living in a post-traditional society. In: Beck U, Giddens A, Lash S, editors. *Reflexive Modernisations: Politics, Tradition and Aesthetics in the Modern Social Order* (pp 56-109). Cambridge: Policy Press, 1994

Acknowledgements

This project has been supported by the FoodSMART project, funded from the European Union's Horizon 2020 Programme under grant agreement no. 643999.

An Econometric Analysis Of Changing Dietary Trends And Its Implications For Health Around The World

Thai Hong Le

Abstract

The worldwide prevalence of obesity almost tripled between 1975 and 2016. This trend is the consequence of demographic, epidemiological and nutrition changes that have taken place as countries develop and become more globalised.

This research aims to forecast global dietary trends to enable policymakers to prevent unhealthy diets taking place in vulnerable countries of the world. To this aim, this research examines the global trends in food consumption for 12 food categories during the period 1961-2013 using data from the Food and Agriculture Organisation (FAO).

Similarities in trends of food supplies among countries over time will be captured in the light of an innovative space-time clustering algorithm inspired by fuzzy logics and copula function. As copula is a well-known multivariate tool for generating multivariate joint distributions with a variety of complex dependence structures, this algorithm is able to detect complex multivariate relationships that traditional dependence measures fail to uncover.

Evidence shows that national diets are evolving over time and across countries in ways that are both similar yet distinct giving rise to patterns that can be investigated statistically. This research presents results from the application of the novel clustering technique that allows the identification of countries agglomeration characterised by similar dietary trends. The findings are further analysed to identify both cultural and economic factors that most matter in explaining the pace of dietary change and the convergence that is observed globally.

The findings will inform the public policy debate on the relationship between diet and obesity and provide evidence to those interested in formulating national policies to promote healthy diets.

a. Corresponding author preferred contact details.

E-mail address: htle@bournemouth.ac.uk

Increase in organic consumption and dietary health – a dynamic approach

Sigrid Denver, Jonas Nordström & Tove Christensen

Abstract

Purpose

The paper investigated whether an increase in the consumption of organic food was related to an improvement in diet composition of individual households.

Background

In Denmark as well as in many other western countries there has been an increase in the demand for organically produced food. According to Willer and Lernoud (2018), the per capita organic consumption in Denmark was the highest in the world in 2016, with 9.7% of food budgets being spent on organic food. A study by Denver et al. (2017) found that less than 4% of the Danish consumers never bought any organic food which suggested that the organic consumption has spread to the majority of the consumers.

There is a considerable literature on consumer perceptions of organic food as well as of factors that affect organic food consumption. Aertens et al. (2009) found that health, which is related to the universal value security, was the strongest argument for purchasing organic food. Despite the importance of health motives as a driver of organic consumption, it seems to be difficult to scientifically prove unambiguously that organic products contain more beneficial nutrients than their non-organic counterparts (see e.g. Huber et al. 2011).

Qualitative as well as quantitative studies have demonstrated a relation between organic purchases and healthy diet composition (Lund and Jensen, 2008; Pelletier et al., 2013). In particular, a study by Denver and Christensen (2015) found the diets of Danish households with higher organic consumption to be more in accordance with the official Danish Dietary Recommendations of a nutritionally well-balanced diet (Danish Veterinary and Food Administration, 2018) involving more vegetables and fruits but less meat and fat/confectionary. While the relation between organic consumption and healthy eating patterns seems to be well established there are very few studies concerning the link between changes in organic consumption and changes in diet.

Methodology

The study was based on 1) observed purchase data at household level and 2) stated behaviour data from a quantitative survey.

Actual food purchasing behaviour of Danish consumers was observed through purchase data for the period 2006-2014. Data were obtained from the market research institute GfK Consumer Tracking Scandinavia and consisted of daily registrations of purchases of daily commodities made by a panel of around 2,300 Danish households. For each purchased item, the data provided information about product type, price, quantity, and whether the product was organic or not. Once a year, detailed background information on socio-demographic characteristics was updated for all panel members.

Stated behaviour data were based on an online survey among Danish respondents. The survey addressed consumption of fruit/vegetables and meat as well as organic purchase habits. Prior to the survey, a pilot study involving 100 panel members was used to test, and subsequently refine, the questionnaire. The main survey was carried out in August 2017 among a sample that was representative for the Danish population according to gender, region, age and education. In total 1,519 respondents participated in the survey and the response rate was 21%.

By using both observed and stated behavioural data about the consumers' foodhabits we could investigate the research question from different angles. The purchase data enabled us to analyse the actual relation between organic consumption and observance of official dietary recommendations. In particular, the data made it possible to observe changes in consumption patterns of individual households over a long time period. Further, using a consumer survey, we could obtain information on a broad spectre of consumers' own perception of their behaviour and reasonings that were not addressed in the purchase data. By combining these data, our conclusions may be considered more robust. However, fundamental differences between the two data sets necessitated slightly different analytical approaches.

In order to examine whether there was a correlation between increased organic consumption and dietary improvements, we focused on two major product groups: 1) Fruits and vegetables which are product groups that the dietary recommendations want to promote the intake of, 2) Meat which is a product group that dietary recommendations want to limit intake of. Dietary improvements were defined as a higher consumption of fruits and vegetables or a lower consumption of meat.

In both data sets, households that had increased their organic consumption were categorized as increasers. In the purchase data the categorization was based on the presence of a substantial increase in actual purchases of organics. The dietary composition of the segment of increasers was in the purchase data compared with two control groups 1) the group of households that had a constant low organic consumption and 2) the group of households that had a constant high organic

consumption. The comparisons between the increasers and the two control groups were made using the non-parametric Wilcoxon signed-rank tests.

In the stated preference the categorization as increasers was based on self-reported increase in the purchases of organics. In the survey the dietary improvements of the increasers were compared with the segment of respondents that reported no increase the organic consumption. These comparisons were made using chi-square tests. All statistical analyses were performed using the software SAS 9.4.

Findings

A little less than 20 % of the sample was categorized as increasers in the purchase data. The non-parametric tests suggested that the diets of increasers included more fruits and vegetables but less meat than the diets of consumers with a constant low organic consumption – a tendency that applied before as well as after the increase in organic consumption. Before the increase in purchases of organics, the segment of increasers had a diet which corresponded to the diet of consumers with a constant high organic consumption. After the increase in purchases of organics, the increasers in average had a slightly healthier diet composition. Hence, the segment of

increasers had a healthy diet composition before they increased purchases of organic and improved it slightly as the purchases of organic rose.

Overall, 20% of the respondents in the survey considered organic food to be healthier than non-organic food. The specific health characteristic of organic products attracting the largest share of consumers was absence of chemicals and artificial additives. Only few respondents perceived organic products to be better in terms of 'containing more useful ingredients (e.g. vitamins)' or 'containing less saturated fatty acids' which represented nutritional viewpoints.

Approximately 40% of the respondents in the survey were categorized as increasers as they stated that they had increased their organic consumption over the last two years. Consumers in this segment were asked to state the reasons for their increased consumption of organics. Most respondents stated that it was due to increased availability of organic products on the market. Relatively few respondents stated that the higher intake of organic food was caused by an overall higher interest in healthy food.

With respect to dietary improvements, almost 45% of the respondents stated to have increased the consumption of fruit and vegetables while approximately half as many had decreased the consumption of meat. Most respondents stated that the reason for the decreased meat consumption was an overall higher interest in healthy food or due to concerns of climate changes. A relatively little share stated that the reason for the decreased meat consumption was a higher interest in organics.

The survey also indicated a positive relation between increased organic consumption and dietary improvements. Hence, the results suggested that the segment of increasers were significantly more likely to have increased the intake of fruits/vegetables than respondents who had not increased the organic

consumption. In particular, almost twice as many in the segment of increasers had decreased the consumption of meat compared to other respondents.

Respondents who both increased the organic consumption and decreased the consumption of meat were asked to specify the order of the behavioural changes. Two groups of respondents on roughly the same size claimed either that 'I started eating less meat and buying more organics at the same time' or that 'I started buying more organics before they started eating less meat'. A smaller group of respondents said that 'I started eating less meat before I started buying more organics'. The remaining 20% of the respondents confirmed to the statement 'I did not fit in any of the categories'.

Contribution to Theory and Practice

The present paper took a dynamic approach and investigated the relation between increase in organic consumption and improvements in dietary habits. Analysis of observed purchase data and stated preference data suggested that consumers who increased the purchases of organics were more likely to have a healthy diet involving many fruits and vegetables but little meat. The purchase data indicated relatively healthy dietary habits before the increase in purchases of organics and suggested an improvement in dietary composition during the increase. The stated preference data supported these results and thereby indicated a correlation between perceived and actual changes in purchasing behaviour.

Overall, our study supported earlier findings but also added new details to the understanding of organic consumption and dietary preferences. The focus on changes in consumption and the novel approach of combining long time series of observed behaviour and stated behaviour revealed new trends. However, the approach also emphasized the complexity of this area.

While the results provided clear indications of a relation between organic consumption and dietary composition they gave only vague suggestions of the causal relationship between dietary habits and changes. This issue was addressed in the survey, where the respondents were asked to indicate whether they increased the organic consumption before or after they decreased the consumption of meat. Only relatively few respondents stated that the decreased meat consumption took place before the increase in purchases of organics. However, before making firm conclusions based on this question, it is important to note that there was public focus on eating organic food before it became politicized to eat less meat (due to e.g. health, animal welfare, climate challenges, culture etc.). Hence, the stated order may reflect societal trends rather than an individual choice based on a specific causality between eating healthy and having a high organic consumption. It is our hope that the generalisation and robustness of these new results on dynamics in organic consumption and healthy eating habits will be tested in future studies.

The survey indicated that organic products only to a limited extent were perceived as being better from a nutritional perspective. Hence, respondents do in general not perceive organic products as beneficial from a nutritional perspective when compared to non-organic products at product level. This result may indicate that the relationship between organic consumption and being more likely to adhere to official dietary guidelines emerged from a general interest in food and health rather than from a perception of organic products as being nutritionally healthier. Knowledge of the relation between increase in organic consumption and changes in dietary preferences is important input to e.g. the development and marketing of new organic products. This is not less relevant as organic consumption spreads to more and more consumer segments and new generations of organic consumers are established.

Selected References

- Aertens, J., Verbeke, W. Mondelaers, K., Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: a review, *British Food Journal*, 111(10), 1140–1167.
- Danish Veterinary and Food Administration (2018). Alt om kost.
<http://altomkost.dk/deofficielleanbefalingertilensundlivsstil/de-officielle-kostraad/>
- Denver, S., & Christensen, T. (2015). Organic food and health concerns: a dietary approach using observed data. *NJAS – Wageningen Journal of Life Sciences*, 74-75, 9-15.
- Denver, S., Christensen, T., & Nordström, J. (2017). Det er lidt dyrere at være en økologisk forbruger – men ikke kun på grund af merpriserne. *Tidsskrift for Landøkonomi*, March 2017 [In Danish].
- Huber, M., Rembiałkowska, E., Średnicka, D., Bügel, S., van de Vijver, L.P.L.(2011). Organic food and impact on human health: Assessing the status quo and prospects of research, *NJAS - Wageningen Journal of Life Sciences*, 58(3–4), 103-109.
- Lund, T.B., & Jensen, K.O. (2008). Consumption of Organic Foods from a Life History Perspective: An Explorative Study among Danish Consumers, *Country Report Denmark*,

Department of Human Nutrition, University of Copenhagen, Denmark.

Pelletier, J.E., Laska, M.N., Neumark-Sztainer, D., Story, M. (2013). Positive Attitudes toward Organic, Local, and Sustainable Foods Are Associated with Higher Dietary Quality among Young Adults, *Journal of the Academy of Nutrition and Dietetics*, 113(1), 127-132.

Is Plastic Fruit Packaging Relevant to German Consumers?

Andreas Lesny, Thomas Decker & Klaus Menrad

Abstract

Purpose of the Research

This research aims at analyzing consumers' estimations related to grapes sold in Germany with a specific interest on fruit packaging of different type. In order to check potential consumer heterogeneity, different consumer segments are identified to get results that are more specific. Students of Bavarian universities were selected as the target group of this quantitative research. Since handling of plastic packaging waste (in particular in sensitive environments as rivers or oceans) is a question to be solved in the coming decades, students could contribute to tackle this problem because they might be in relevant business positions in future or they will be household-decision-makers of tomorrow in their private sphere. In addition, students as consumers, who will be potentially high-income-earners soon, are an attractive target group for retail and industry, if they want to prepare for important consumer groups in future.

Background/Motivation/Support

Germany is one to the three top European countries producing plastic packaging waste. In 2015 the German per capita consumption of plastic packaging was 37.4 kg, which was 6 kg per capita over the European average and therefore far from an environmental sustainable level (Neligan, 2017). Fruit packaging is part of this plastic waste and its amount has even risen instead of being reduced in recent years. Certain fruits (e.g. grapes) show plastic packaging growth rates of 80% from 2010 to 2014 in Germany (Istel et al., 2015). However, several studies carried out in recent years prove that a majority of consumers do not like plastic packaging (Bovensiepen et al., 2018; Bovensiepen et al., 2015). Still, many grocery stores sell their fruit, especially grapes, packaged in plastic. A main reason for this is EU regulation (EC) No. 543/2011, laying down quality requirements for fruit. However, plastic fruit packaging is only necessary in some cases (e.g. protection, portioning or labelling) at the point of sale (Istel et al., 2015).

Methodology

The questionnaire of the quantitative study was designed based on relevant literature (Kompetenzzentrum für Ernährung, 2014; Bundesministerium für Ernährung und Landwirtschaft, 2014; Roosen et al., 2013; Nessel, 2013; Plumb et al., 2013; Ragaert et al., 2004). Data was collected with an online survey, composed of six sections. The first two sections consisted of questions regarding fruit buying behavior and knowledge concerning plastic fruit packaging. The third section, the main section, investigated consumer preferences using a choice experiment. The fourth and fifth sections consisted of questions regarding the willingness-to-pay for plastic packaging alternatives, the attitude towards plastic fruit packaging and the environmental attitude. In the last section, sociodemographic characteristics of the respondents

were recorded. The questionnaire consisted of 43 questions, which were tested with 24 people in a pre-test. The online survey was realized in January 2018. To address the target group (students of Bavarian universities), student representatives of all 53 universities in Bavaria were asked to distribute the online survey among all students. The sample size contains 999 respondents, who are older than 18 years and answered the whole questionnaire.

As said the main part of the study was the choice experiment (choice-based conjoint analysis: CBC). This kind of experiment is hypothetical as there is no real purchasing process, but the context of a decision-making process among different types of grapes is simulated (Borghi, 2009). It is a common methodology in science and has been applied in several studies regarding consumer preferences for food products (Sigurdsson et al., 2017; Skreli et al., 2017; Szűcs et al., 2014). Furthermore, hypothetical attributes can be included in a choice-based conjoint analysis, e.g. bioplastic fruit packaging and grapes grown in Germany, which are available only during harvest season in specific regions. In a CBC experiment, multiple product profiles are constructed, described by various attributes and levels. These product alternatives are presented in the survey to simulate a purchasing scenario, in which the respondent is asked to choose the preferred option among the product alternatives or to select a “no buy” option (SawtoothSoftware, 2017). The Sawtooth Software Lighthouse 9.5.3 generated the product profiles randomly. For this study, twelve choice tasks with three product alternatives and a “no buy” option for each choice task were created. For this purpose, the product (grapes) was presented, corresponding to 500 grams of green grapes of high quality. It was mentioned, that the fictional purchasing process took place in the grape season. The following attributes of grapes were used in the CBC experiment:

- 1) country of origin (Germany, Greece, Peru),
- 2) cultivation method (conventional farming, organic farming),
- 3) type of packaging (plastic, bioplastic, no packaging), and their relation with
- 4) price (2.39 €, 2.99 €, 3.59 €).

Other attributes such as taste and appearance of the grapes were not included in the experiment because consumers cannot assess these attributes through an online survey. In addition, the color of the grapes (green, purple) was excluded as green grapes were shown throughout in the experiment. Hierarchical Bayes estimation was used to analyze the data of the choice experiment. In case heterogeneity among the respondents exists, consumer segments were determined by applying a latent class analysis. Therefore, a combination of Akaike information criterion and Bayesian information criterion was used for model-selection to minimize the disadvantages of each criterion (Schwarz, 1978).

Findings

Among the most important results is, that the type of packaging (28.5 %) is relevant to students when they buy grapes. They want to avoid plastic packaging and prefer non-packaged grapes. Furthermore, the country of origin (35.8 %) is the most important attribute within the study and the most preferred country of origin is Germany. The majority of the respondents avoids Peru, the country of origin with the longest transport route. Besides that, the price of the grapes (23.8 %) is placed third with respect to the importance of the analysed grape attributes, followed by the cultivation method (11.8 %).

Based on their choice decisions, five consumer segments were determined with segment sizes from 12.0 % to 30.7 % of the respondents. For members of the smallest segment, consisting of 12.0 % of the participants, the cultivation method (organic farming preferred) is the most important attribute. On the other side, there is the “regionality enthusiast”, for whom the country of origin (54.7 %) is the most preferred attribute (preferably Germany). This is the biggest segment, representing 30.7 % of the respondents. Furthermore, there is the “bargain hunter”, consisting of 24.0 % of the participants, for whom a favourable price (54.6 %) is the most important attribute. Besides, two consumer segments were found for whom the type of packaging is among the most relevant attributes. On the one hand, there is the “eco-friendly consumer”, representing 16.2 % of the respondents, for whom the price is the least important attribute (8.3%), whereas the type of packaging (no packaging preferred) and country of origin (preferably Germany) are the most important attributes. On the other hand, there is a consumer segment called “price-conscious plastic avoider”, representing 17.1 % of the participants. For this group, the type of packaging (45.7 %) is the most important attribute, followed by the price (27.8 %). The members of this segment want to avoid plastic fruit packaging, but they also want to buy cheap grapes.

This study also shows that for a majority of the respondents the country of origin is more important than the cultivation method as consumers associate positive values like high quality and short transport distances with domestically grown grapes (Stracke & Homann, 2017; Warschun et al., 2014; Nessel, 2013). Furthermore, the results implicate that for most participants the type of packaging is relevant, and they do not like plastic fruit packaging.

Contributions to Theory and Practice

This contribution adds to the existing literature about consumer estimation of plastic fruit packaging for fruits shown at the example of grapes. A special feature of this study is the target group, which is represented by students of Bavarian universities. The results could be used in order to develop marketing strategies for plastic fruit packaging alternatives (e.g. non-plastic fruit packaging). Furthermore, the results may provide grape growers and food retailers additional insights in the organization of the value chain. However, it is important to consider that the method used was a hypothetical approach for students of Bavarian universities. For this reason, results may differ for a real choice experiment and other target groups (e.g. population of Germany).

Selected References

- Borghgi, C. (2009). Discrete choice models for marketing. New methodologies for optional features and bundles. Retrieved from [https://www.universiteitleiden.nl/binaries/content/assets/science/mi/scripties / borghimaster.pdf](https://www.universiteitleiden.nl/binaries/content/assets/science/mi/scripties/borghimaster.pdf)
- Bovensiepen, G., Fink, H., Schnück, P., Rumpff, S., & Raimund, S. (2018). Verpackungen im Fokus. Die Rolle von Circular Economy auf dem Weg zu mehr Nachhaltigkeit. Retrieved from

- <https://www.pwc.de/de/handel-und-konsumguter/pwc-studie-verpackungen-im-fokus-februar-2018-final.pdf>
- Bovensiepen, G., Fink, H., Rumpff, S., & Leskow, M. (2015). Verpackungsfreie Lebensmittel – Nischeoder Trend? Verbraucherbefragung. Retrieved from <https://www.pwc-wissen.de/pwc/de/shop/publikationen/Verpackungsfreie+Lebensmittel/?card=12755>
- Bundesministerium für Ernährung und Landwirtschaft (2014). Einkaufs- und Ernährungsverhalten in Deutschland. TNS-Emnid-Umfrage des BMEL. Bundesministerium für Ernährung und Landwirtschaft. Retrieved from http://www.bmel.de/SharedDocs/Downloads/Umfragen/TNS-Emnid-EinkaufsErnaehrungsVerhaltenInDeutschland.pdf?__blob=publicationFile
- Istel, K., Fitzner, S., & Mischnick, R. (2015). Vorverpackungen bei Obst und Gemüse. Zahlen und Fakten 2000 bis 2014. Retrieved from https://www.nabu.de/imperia/md/content/nabude/konsumressourcenmuell/160531-nabu-obst_gemuese_verpackungen_studie.pdf
- Kompetenzzentrum für Ernährung (2014). Der bayerische Ernährungsmonitor 2014. Eine repräsentative Befragung der bayerischen Bevölkerung zum Thema Ernährung. Retrieved from https://www.kern.bayern.de/mam/cms03/wissenschaft/dateien/neu_bayerischer_ern%C3%A4hrungsmonitor_2014.pdf
- Neligan, A. (2017). Plastics Strategy: Wrapping the EU waste problem. Retrieved from <https://www.iwkoeln.de/en/press/iw-news/beitrag/adriana-neligan-wrapping-the-eu-waste-problem-371106.html>
- Nessel, G. (2013). Wie steht der Verbraucher heute zur Regionalität? Studie 2013. Retrieved from http://www.dlg-verbraucher.info/fileadmin/downloads/studien/DLG_Regionalitaet_2013.pdf
- Plumb, A., Downing, P., Parry, A., & Icaro Consulting (2013). Consumer Attitudes to Food Waste and Food Packaging. Retrieved from http://www.wrap.org.uk/sites/files/wrap/Report%20-%20Consumer%20attitudes%20to%20food%20waste%20and%20packaging_0.pdf
- Ragaert, P., Verbeke, W., Devlieghere, F., & Debevere, J. (2004). Consumer perception and choice of minimally processed vegetables and packaged fruits. *Food Quality and Preference*, 15(3), 259–270. DOI: 10.1016/S0950-3293(03)00066-1.
- Roosen, J., Köttl, B., & Hasselbach, J. (2013). Regional und Bio: Kaufmotive und Kaufverhalten bei bayerischen Ökoprodukten. Retrieved from https://www.mcr.wi.tum.de/fileadmin/w00bet/www/Pictures/pdf/Projekte/Bericht_Regional_und_Bio_2016.pdf
- Sawtooth Software (2017). The CBC System for Choice-Based Conjoint Analysis. Retrieved from <https://www.sawtoothsoftware.com/download/techpap/cbctech.pdf>
- Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, 6(2), 461–464. DOI: 10.1214/aos/1176344136.
- Sigurdsson, V., Vishnu Menon, R. G., & Fagerstrøm, A. (2017). Online Healthy Food Experiments. Capturing Complexity by Using Choice-Based Conjoint Analysis. *The Behavior Analyst*, 40(2), 373–391. DOI: 10.1007/s40614-017-0114-9.

- Skreli, E., Imami, D., Chan-Halbrendt, C., Canavari, M., Zhllima, E., & Pire, E. (2017). Assessing consumer preferences and willingness to pay for organic tomatoes in Albania. A conjoint choice experiment study. *Spanish Journal of Agricultural Research*, 15(3), e0114. DOI: 10.5424/sjar/2017153-9889.
- Stracke, S., & Homann, B. (2017). Branchenanalyse Obst-, Gemüse- und Kartoffelverarbeitende Industrie. Entwicklung von Markt, Beschäftigung und Arbeitsbedingungen. Retrieved from https://www.boeckler.de/pdf/p_study_hbs_351.pdf
- Szűcs, V., Guerrero, L., Claret, A., Tarcea, M., Szabó, E., & Bánáti, D. (2014). Food additives and consumer preferences. A cross-cultural choice based conjoint analysis. *Acta Alimentaria*, 43(1), 180–187. DOI: 10.1556/AAlim.43.2014.Suppl.25.
- Umweltbundesamt (2017). Verpackungsabfälle. Retrieved from <https://www.umweltbundesamt.de/daten/ressourcen-abfall/verwertung-entsorgung-ausgewaehlter-abfallarten/verpackungsabfaelle#textpart-1>
- Warschun, M., Glusac, S., Rucker, M., & Günther, D. (2014). Lebensmittel: Regional istgefragter als bio. Retrieved from <http://www.atkearney.de/documents/856314/2519692/BIP-lebensmittel-Regional-ist-gefragter-als-bio.pdf>

The Use of Technological Devices for Water Adjustment as a Product Innovation in Gastronomic Facilities

Kristína Bednářová & Jiří Zelený

Abstract

Purpose of the Research

The aim of the research was to compare the sensory differences of selected beverages made from the filtered tap water by reverse osmosis (RO), which is considered to be a product innovation, and the tap water with no treatment (NT) via sensory evaluation. The use of RO is closely connected with the quality of tap water and other beverages made from tap water sold in gastronomic facilities. In addition, RO influences the nutritional and health aspects of tap water.

Background/Motivation/Support

Water is located in every section of the gastronomic facility (DiVita, 2005) and its quality plays fundamental role in gastronomy, therefore water usage is closely related to the right treatment. Quality of the water can be improved by various water purification technologies, such as reverse osmosis, that are considered to be a product innovation (Talat & Bhaduri, 2017). Manufacturers and distributors of filtration devices highlight the need for water adjustment not only for technical reasons but also due to the quality of the final product, such as taste of beverages and meals (Gledhill, 2003; DiVita, 2005, Ray & Jain, 2011; Hendon, Colonna-Dashwood & Colonna-Dashwood, 2014; Pospisil, 2017). Concurrently, water filtration machines determine the nutritional and health aspects and can be used for a treatment of water with harmful content of some chemical elements, e.g. high arsenic content (Barnaby, Liefeld, Jackson, Hampton & Stanton, 2017). In restaurant facilities not only a tap water can be served, but different beverages made from tap water are prepared, such as tea or coffee. Usage of reverse osmosis for water treatment in order to enhance the quality of drinks in restaurants is not unequivocal. While some of the published studies show that reverse osmosis determines the extraction of nutritional components in green tea (Zhou, Chen & Ni, 2009) and influences the sensory properties of drinks, this study presents higher importance of default tap water used than later usage of water filtration machine.

Methodology

For all tasting samples (water, black tea and percolated coffee) Prague tap water from Újezd location was used. Tea was prepared by extraction of 11g of tea in 845ml of water at 85°C for 3 minutes. Coffee was prepared by passing of 1000ml of water through 59g of coffee at 85°C for 5 minutes and 30 seconds. To obtain the results, a discriminatory triangle test and a hedonic evaluation method were used. Discriminatory triangle test consisted of marking one different sample of three, with two samples being the same. Subsequently, the evaluators compared sensory indicators of selected beverages. The perceived intensity was expressed on a

discontinuous unipolar numerical scale with a range from 1 to 10 and a verbal expression from the lowest to the highest value. For hedonic evaluation data processing, nonparametric Wilcoxon pair test ($\alpha=5\%$) was used to analyse the range of sensory difference since the non-normal distribution was possible to assume based on the number of evaluators in expert panel. Various sensory characteristics were evaluated including appearance, nose and palate of beverages.

Findings

Analytical values for selected beverages showed following percentage values of TDS (total dissolved solids) content: 0.02% for NT water, 0.01% for RO water, 0.30% for NT tea, 0.25% for RO tea, 1.35% for NT coffee and 1.30% for RO coffee. The results of the triangle test (tested at a significance level $\alpha=5\%$) have shown that there is no perceptible sensory difference when using RO water and NT water for all three types of beverages. Almost all of the sensory criteria were not statistically significant across all samples tasted ($p>0.05$). Hedonic evaluation brought only one statistically significant result - the aroma of the tea had become weaker when using filtered water ($p=0.04$). Close to the statistical significance was the appearance of coffee, which turned out to be cleaner ($p=0.06$), and acidity of tea ($p=0.07$) that had been reduced by filtration of water. Sweetness had increased moderately in all tasted samples when the RO water was used. The results of the study show that the sensory difference would probably not be recognizable to the average consumer, which is an interesting finding with respect to the amount of information that is dedicated to the change of the taste when RO water is used (Gledhill, 2003; DiVita, 2005; Hendon, 2014; Pospisil, 2017).

Contributions to Theory and Practice

According to the Safe Water for International Travellers (SWIT), drinking water is divided into five categories from the lowest to the highest quality and safety. In view of this assessment, the Czech Republic is ranked in the category with the highest quality water (Gari, 2006). Therefore, the small significance of sensory differences can be due to the high quality of the input water used in the research. Based on the high quality of the input water, the use of the RO filter device does not have a significant effect on sensory quality. That is why restaurant facilities in cities with high quality water should consider if the usage of RO water is necessary. While nutritional aspects of water can be influenced, the sensory characteristics of beverages are barely to be recognized by consumers.

Selected References

- Barnaby, R., Liefeld, A., Jackson, B. P., Hampton, T. H., & Stanton, B. A. (2017). Effectiveness of table top water pitcher filters to remove arsenic from drinking water. *Environmental Research*, 158(October), 610-615.
- DiVita, L. J. (2005). Water Water Everywhere. *Chef Magazine*, 15(11), 40-41.
- Gari, D. W. (2006). Celosvětové hodnocení bezpečnosti pitných vod. *Praha: Státní zdravotní ústav*(1-3). Retrieved from: <http://www.szu.cz/uploads/documents/chzp/voda/pdf/swit.pdf>
- Gledhill, B. (2003). Equipment. *Caterer & Hotelkeeper*, 192(4295), 85-85.

Hendon, C. H., Colonna-Dashwood, L., & Colonna-Dashwood, M. (2014). The Role of Dissolved Cations in Coffee Extraction. *Journal of Agricultural and Food Chemistry*, 62(21), 4947–4950.

Pospisil, A. (2017). Let's Make Water for Coffee Easier for Everybody. *Brno: European Coffee Trip*. Retrieved from: <https://europeancoffeetrip.com/water-for-coffee-made-easier/>

Ray, C., & Jain, R. (2011). *Drinking Water Treatment: Focusing on Appropriate Technology and Sustainability*. Dordrecht: Springer Netherlands.

Talat, N., & Bhaduri, S. (2017). Incremental innovations, information contagion, and path dependence: the case of drinking water purification technologies in urban India. *Industrial and Corporate Change*, 26(6), 1089-1108.

Zhou, D. R., Chen, Y. Q., & Ni, D. J. (2009). Effect of water quality on the nutritional components and antioxidant activity of green tea extracts. *Food Chemistry*, 113(1), 110-114.

Understanding The Socialisation Of Appearance-based Preferences For Fresh Fruit And Vegetables

Annesha Bernadette Makhal, Kirsten Robertson, Miranda Miroso & Maree Thyne

Abstract

Purpose of the Research

A significant opportunity to reduce avoidable food waste is to reduce the waste of suboptimal fresh fruit and vegetables. Whilst the suboptimal food waste literature is replete with understanding adult attitudes towards suboptimal foods and strategies to counter the non-acceptance and waste of these foods, little is known about how consumers have been socialised to form these appearance-based preferences. The purpose of this study is to attempt to understand children's attitudes and perceptions towards suboptimal fruit and vegetables, as this sets the stage to understand how these attitudes and perceptions have been socialised. This extended abstract summarises the preliminary findings of the attitudes towards and associated perceptions of suboptimal fruit and vegetables from the perceived quality cues and attributes perspective.

Background

Over the last ten years, food waste research has gained momentum amongst the academic community (Chen, Jiang, Yang, Yang, & Man, 2017). Suboptimal food waste in particular has drawn research interests, particularly in Europe (Rohm et al., 2017). The Food and Agriculture Organisation of the United Nations estimates that a third of the food grown on the planet is wasted (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011). Of this waste, fruit and vegetables (F&Vs) are the most wasted foods at 45 percent (FAO, 2017). A significant part of this waste is contributed to through marketing standards that specify the cosmetic requirements that fresh produce needs to comply by to be sold in the marketplace. Aschemann-Witzel, de Hooge, Amani, Bech-Larsen, and Oostindjer (2015) have named these F&Vs rejects as *suboptimal foods*. Owing to the scale of F&V waste throughout the food supply chain (Mena, Adenso-Diaz, & Yurt, 2011), especially because they fail to meet an appearance standard, the focus of this research is suboptimal F&Vs. Suboptimal food waste is avoidable and hence re-evaluating the value of suboptimal foods could provide significant opportunities to reduce the environmental and social footprint the waste of these foods bring (Aschemann-Witzel, Giménez, & Ares, 2018).

Most research on suboptimal foods have studied adult attitudes towards and strategies to improve acceptance of suboptimal foods. Research on attitudes towards suboptimal fruit and vegetables suggest that the general attitude towards suboptimal F&Vs is negative (Bunn, Feenstra, Lynch, & Somer, 1990; Yue et al., 2007). While these studies show that suboptimal F&Vs are perceived to be largely inedible and unmarketable, recent research shows that consumer attitudes and perceptions of edibility varies across a number of factors. For example, consumers are more accepting of shape defects rather than blemishes in F&Vs (de Hooge et al., 2017). Similarly, suboptimal food acceptance also depends upon the situations where consumers make the decision to either accept or reject suboptimal foods. That is, they are more likely to consume

suboptimal foods at home rather than buy suboptimal foods from the supermarkets (de Hooge et al., 2017), and once suboptimal foods are purchased, they are less likely to be wasted at home (Aschemann-Witzel, Jensen, Jensen, & Kulikovskaja, 2017). With regards to consumers' willingness to buy suboptimals, price discounts are one of the most important factors to influence acceptance of suboptimal F&Vs (de Hooge et al., 2017; Helmert, Symmank, Pannasch, & Rohm, 2017). Additionally, several other factors also influence acceptance of suboptimal foods, such as socio-demographic factors like age, nationality, and gender (Aschemann-Witzel, 2018; de Hooge et al., 2017; Loebnitz & Grunert, 2015; Loebnitz, Schuitema, & Grunert, 2015), psychographic factors (de Hooge et al., 2017; Loebnitz et al., 2015), in-store factors related to the marketing of suboptimal foods (Aschemann-Witzel, 2018; Helmert et al., 2017), and at-home factors relating to the potential use of suboptimal foods (Aschemann-Witzel, 2018; Aschemann-Witzel et al., 2017).

Recently in New Zealand, suboptimal F&V's have gained more attention with retailers attempting to sell them in store (Love Food Hate Waste New Zealand, 2017). While studying adult's perspectives towards suboptimal F&Vs is useful, there is a dearth of research that focusses on how these attitudes are formed. To understand *how* and *why* these attitudes have formed, the perspective of children become particularly useful. In fact, most food socialisations begin at an early age and remain mostly stable through to early adulthood (Fallon, Rozin, & Pliner, 1984). The aim of this short abstract is to present the argument for studying the attitudes and perceptions of children towards suboptimal F&Vs to understand the development of these attitudes. This echoes with the strategy of changing beliefs about suboptimality that seeks to improve consumer value perception towards suboptimal foods (Aschemann-Witzel et al., 2018).

Methodology

Focus group interviews were conducted in New Zealand with children from age five to eleven ($N = 97$), which was preceded by an observation study that involved a play shopping activity. The study had ethical approval from the University of Otago and the participating school, and both the parents and participants had given their written and informed consent. The entire data collection was completed over two days and within the premises of the school. The first part of the study focussed on understanding children's attitudes and perceptions towards suboptimal F&Vs in comparison to optimal F&Vs.

Preliminary Findings

The shopping activity revealed that the general trend was that the optimal varieties were preferred over the suboptimal varieties of the F&Vs used. There were also no gender and age differences between those who chose the optimal versus those who chose the suboptimal varieties. The first set of questions asked during the group discussions attempted to understand the underlying perceptions adjunct the expressed attitudes towards the optimal and suboptimal F&Vs. The preliminary results show that the *perception of quality cues* related to the shape, colour, texture, blemishes and overall appearance are used to derive *inferences* about the *quality attributes* of taste, freshness, ripeness and nutritional value. All of these together, are used to judge the *outcome credence* attribute of edibility.

Discussion

A common phenomenon observed with the expressed attitudes towards suboptimal and optimal F&V's is an interaction of the associated perceptions to the extent it represents conflicting attitudes. Such attitudinal imbalances have also been reported in past research wherein concerns health and safety are opposing the need to use leftovers at home (Watson & Meah, 2013) and the need to live up to the image of being a good provider clashes with the need to practice thrift at home (Porpino, Wansink, & Parente, 2016). According to Asp (1999), liking and disliking certain foods is not only determined by psychological factors (e.g., de Hooze et al., 2017) but also by cultural factors which establish the food habits and practices. From a sociological perspective, food preferences are a result of socially-determined practices (Evans, 2011, 2012), such that inter-generational differences with food handling and valuation can be observed (Evans, Campbell, & Murcott, 2013; Osborn, 2016). Food suppliers of the food supply chain greatly influence the type of produce consumers are exposed to, and hence socialise their food preferences by creating expectations of what fresh produce should look like (Devin & Richards, 2016; Osborn, 2016). With regards to children, different levels of sociological factors such as food involvement with family members and food experiences could explain the development of the appearance-based preferences expressed through attitudes. Future research should explore these socialisations that construct the formation of appearance-based preferences.

References

- Aschemann-Witzel, J. (2018). Consumer perception and preference for suboptimal food under the emerging practice of expiration date based pricing in supermarkets. *Food Quality and Preference*, 63, 119-128. doi:10.1016/j.foodqual.2017.08.007
- Aschemann-Witzel, J., de Hooze, I., Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-related food waste: Causes and potential for action. *Sustainability*, 7(6), 6457-6477. doi:10.3390/su7066457
- Aschemann-Witzel, J., Giménez, A., & Ares, G. (2018). Consumer in-store choice of suboptimal food to avoid food waste: The role of food category, communication and perception of quality dimensions. *Food Quality and Preference*, 68, 29-39. doi: 10.1016/j.foodqual.2018.01.020
- Aschemann-Witzel, J., Jensen, J. H., Jensen, M. H., & Kulikovskaja, V. (2017). Consumer behaviour towards price-reduced suboptimal foods in the supermarket and the relation to food waste in households. *Appetite*, 116, 246-258. doi:10.1016/j.appet.2017.05.013
- Asp, E. H. (1999). Factors affecting food decisions made by individual consumers. *Food Policy*, 24(2-3), 287--294. doi:10.1016/s0306-9192(99)00024-x
- Bunn, D., Feenstra, G. W., Lynch, L., & Somer, R. (1990). Consumer Acceptance of Cosmetically Imperfect Produce. *Journal of Consumer Affairs*, 24(2), 268-279. doi: 10.1111/j.1745-6606.1990.tb00269.x
- Chen, H., Jiang, W., Yang, Y., Yang, Y., & Man, X. (2017). State of the art on food waste research: a bibliometrics study from 1997 to 2014. *Journal of Cleaner Production*, 140, 840-846. doi:10.1016/j.jclepro.2015.11.085

- de Hooge, I. E., Oostindjer, M., Aschemann-Witzel, J., Normann, A., Loose, S. M., & Almlí, V. L. (2017). This apple is too ugly for me! *Food Quality and Preference*, 56, 80-92. doi:10.1016/j.foodqual.2016.09.012
- Devin, B., & Richards, C. (2016). Food Waste, Power, and Corporate Social Responsibility in the Australian Food Supply Chain. *Journal of Business Ethics*. doi:10.1007/s10551-016-3181-z
- Evans, D. (2011). Blaming the consumer – once again: The social and material contexts of everyday food waste practices in some English households. *Critical Public Health*, 21(4), 429-440. doi:10.1080/09581596.2011.608797
- Evans, D. (2012). Binning, gifting and recovery: The conduits of disposal in household food consumption. *Environment and Planning D: Society and Space*, 30(6), 1123-1137. doi:10.1068/d22210
- Evans, D., Campbell, H., & Murcott, A. (2013). A brief pre-history of food waste and the social sciences. *The Sociological Review*, 60(S2), 5-26. doi:10.1111/1467-954x.12035
- Fallon, A. E., Rozin, P., & Pliner, P. (1984). The child's conception of food: The development of food Rejections with special reference to disgust and contamination sensitivity. *Child Development*, 55(2), 566-575. doi:10.2307/1129968
- FAO. (2017). Save food: Global initiative on food loss and waste reduction. Retrieved from <http://www.fao.org/save-food/resources/keyfindings/infographics/fruit/en/>.
- Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., & Meybeck, A. (2011). *Global food losses and food waste - Extent, Causes and prevention*. Retrieved from Rome: <http://www.fao.org/docrep/014/mb060e/mb060e.pdf>.
- Helmert, J. R., Symmank, C., Pannasch, S., & Rohm, H. (2017). Have an eye on the buckled cucumber: An eye tracking study on visually suboptimal foods. *Food Quality and Preference*, 60, 40-47. doi:10.1016/j.foodqual.2017.03.009
- Loebnitz, N., & Grunert, K. G. (2015). The effect of food shape abnormality on purchase intentions in China. *Food Quality and Preference*, 40, 24-30. doi:10.1016/j.foodqual.2014.08.005
- Loebnitz, N., Schuitema, G., & Grunert, K. G. (2015). Who buys oddly shaped food and why? Impacts of food shape abnormality and organic labeling on purchase intentions. *Psychology & Marketing*, 32(4), 408-421. doi:10.1002/mar.20788
- Love Food Hate Waste New Zealand. (2017). Introducing The Odd Bunch: Why you should love imperfect fruit and vegetables. Retrieved from <https://lovefoodhatewaste.co.nz/introducing-the-odd-bunch/>.
- Mena, C., Adenso-Diaz, B., & Yurt, O. (2011). The causes of food waste in the supplier–retailer interface: Evidences from the UK and Spain. *Resources, Conservation and Recycling*, 55(6), 648-658. doi:10.1016/j.resconrec.2010.09.006
- Osborn, S. (2016). Wastage of food. *Encyclopedia of Food and Health*, 447-452. doi:10.1016/b978-0-12-384947-2.00733-9
- Porpino, G., Wansink, B., & Parente, J. (2016). Wasted Positive Intentions: The Role of Affection and Abundance on Household Food Waste. *Journal of Food Products Marketing*, 22(7), 733-751. doi:10.1080/10454446.2015.1121433

- Rohm, H., Oostindjer, M., Aschemann-Witzel, J., Symmank, C., V, L. A., de Hooge, I. E., . . . Karantininis, K. (2017). Consumers in a Sustainable Food Supply Chain (COSUS): Understanding Consumer Behavior to Encourage Food Waste Reduction. *Foods*, 6(12). doi:10.3390/foods6120104
- Watson, M., & Meah, A. (2013). Food, waste and safety: Negotiating conflicting social anxieties into the practices of domestic provisioning. *The Sociological Review*, 60(S2), 102-120. doi:10.1111/1467-954x.12040
- Yue, C., Jensen, H. H., Mueller, D. S., Nonnecke, G. R., Bonnet, D., & Gleason, M. L. (2007). Estimating Consumers' Valuation of Organic and Cosmetically Damaged Apples. *HortScience*, 42(6), 1366–1371.

Olfactory Cues And Purchase Behavior In Food Products: The Category Approach

Kaisa Kivioja

Abstract

Purpose of the Research

This study examines the impact of olfactory cues on purchase behavior in food products. Specifically, we approach the research question from a category management perspective.

Background/Motivation/Support

Rationally designed stores are being transformed into more engaging environments. Specifically, the use of olfactory cues has earned its place among other sensory cues and for a good reason—the presence of a scent has led to higher arousal, pleasure, and behavioral intentions compared with its absence (Roschk et al., 2017). Given the close connection between scents and food (Elder & Krishna, 2010), one could expect major implications for food product marketing. Imagine a sniff of cappuccino greeting customers who are approaching coffee and tea shelves in a supermarket, resulting in a category-wide sales increase, which is a tempting idea.

However, only a few studies have investigated olfactory cues within food products. Earlier research suggests that a congruent scent increases variety seeking within a category but does not have a positive effect on closely positioned categories, at least in laboratory conditions (Mitchell, Kahn & Knasko, 1995; Bosmans, 2006). Kivioja (2017) conducted research in an actual store and found that a chocolate scent both increased the sales of a novelty product (strawberry chocolate) within chocolate plates and boosted category sales. Aligned with previous sensory marketing research, the study supported the congruence between scent and the target (c.f. Herz, 2010; Chebat et al., 2009). Paradoxically, experiments outside the food context have not reported similar results (e.g., magazines in the book store, Schifferstein & Blok, 2002) or have required significant supporting actions (visual display and lighting for wineglasses in IKEA, Hultén, 2012). What is it that makes food products so special from a category management perspective? One plausible explanation for why olfactory cues have a greater impact on food products may be the special relationship between olfaction and taste. This relationship enables a straightforward, easy-to-process *congruence* between the scent and the target category. Odors can increase attention toward a congruent visual object (Seo et al., 2010), and scents are known to signal taste (Herz, 2006; Högg & Alba, 2007). Reflecting on the earlier studies by Knasko (1995) and Dalton (2000), Seo et al. (2010) postulated that a more straightforward congruence (orange scent, picture of oranges) has a greater impact on selective attention than a mere thematic congruence (baby powder odor, picture of a mother holding an infant). This theory is supported by prior research, suggesting that a mere thematic congruence between the scent and the targeted product is inadequate (Schifferstein and Blok, 2002). In food products, the olfactory match is clearer: coffee should smell like coffee, chocolate like chocolate.

However, this special relationship between scents and food products also poses challenges. If a scent is distinctive, such as coffee, it quickly becomes incongruent with other product categories that are closely positioned in the store, such as tea, for example. Consumers have a limited physical and mental budget to spend on different categories, which is why actions in one category often have implications for other categories, irrespective of whether they are complementary to one another (Hong et al., 2016). Hence, addressing a potential spill-over or cannibalization effect is paramount.

Another explanation why olfactory cues have a greater impact on food products than other categories is the *hedonic orientation* related to several food categories. It highlights the tendency of some consumers to have a pleasurable, enjoyable approach to shopping, with emphasis on products that bring enjoyment or gratification. Later, hedonic orientation has been used essentially as a part of the food product context (e.g., Anic et al., 2014) and sensory preference context (Neeley et al., 2010) in consumer decision-making style literature (e.g., Sproles & Kendall, 1986). Interestingly, Bouzaabia (2014) found that hedonic consumers responded best to olfactory cue (sales, Nike store). In a food product context, Kivioja's study (2018, ahead of print) found similar results (cookie sales, hedonistic men). In this case, hedonism could operate on two levels—consumers' shopping orientation and the product category itself.

Could it be, then, that olfactory cues are effective in guiding consumer behavior but primarily in a hedonic context? Earlier research has emphasized the emotional aspect of processing olfactory cues (Chebat and Michon, 2003; Haberland, 2010). Olfaction research has demonstrated that humans perceive scents differently and that these differences are not only attributable to gender or age but also to psychological traits (e.g., emotionally stable men, Koelega, 1994; shy men, Herbener et al., 1989). The scarce extant studies have focused on consumers and their traits. From a category management perspective, handpicking those shoppers who can be classified as hedonically oriented is not possible. Instead, we can distinguish between hedonic and utilitarian product categories.

The purpose of this study is to investigate the impact of olfactory cues on category performance within food products.

We test the two theories in a field experiment, as explained in the next section. The expected theoretical contribution is twofold. First, we integrate category management as a part of sensory marketing research. This approach broadens our understanding of the effects of sensory marketing, as extant research has ignored this scope of target and potential impact on related products. Second, we test two plausible theories to explain the effects within food products, namely cue congruence and hedonic orientation. Managerially, the results provide clear guidance for category managers and retailers in harnessing scents for category management purposes. From a methodological perspective, we complement our quantitative analysis with a qualitative method to better understand the results.

Methodology

A field experiment was conducted to test the theories and hypotheses. The experiment took place in a hypermarket that belongs to a European retailer chain, and it lasted for 5 weeks, with 8 weeks of control period.

To determine a utilitarian and hedonic food product category for this experiment, we referred to extant literature for recommendations. Cramer and Antonides (2011) defined apple and raisins as utilitarian products, whereas chocolate bars, lollipops, and crisps were hedonic products.

Because a pleasant, congruent scent had to be found, we chose apples and candies as the focal categories. To study a potential cannibalization or spill-over effect on a closely related category, we also included pears (for apples) and chocolates (for candies) in the analysis.

To analyze the sales data, we used Mann-Whitney because of the non-linear distribution of data. To ensure a correct interpretation of the data, we also used semi-structured interviews during the control and experimental periods.

Findings

The sales of both focal categories, apples (utilitarian) and candies (hedonic), were higher during the experimental condition than the control condition. Apple sales during the campaign were significantly higher than that in the control weeks, with the sales being 25.3% higher during the campaign ($U = 6$, $z = -2.05$, $r = -0.57$, and $p = 0.040$). Conversely, the sales of pears show a minor drop of 6.3%, the difference being statistically non-significant ($U = 19$, $z = -0.15$, $r = -0.04$, and $p = 0.943$).

The presence of a candy scent had a positive impact on both candy and chocolate sales. The sales of the focal product category, candies, were, on average, 43.2 % higher during the experimental period than the control period. Furthermore, the related category, chocolate, benefited from the experiment, with a sales increase of 8.8%. Interestingly, not all sub-segments within candy and chocolate developed at the same growth rate. Instead, the greatest impact was on those sub-segments that a) were most congruent with the scent used and/or b) had the smallest portion size, highlighting a low perceived risk. The linear mixed model confirms that in addition to the scent, the sub-segment itself is a significant factor.

Analyzing the semi-structured interviews reveals why there was a sales impact; was it about a continuing habit or a more impulsive, hedonic reaction to the presence of scent? During the experimental condition, more respondents stated having bought the product in question—whether apples or candies—for their own enjoyment rather than as a planned purchase. This finding implies that the presence of scent may have triggered a hedonic desire.

Our study has some inspiring theoretical contributions. First, it contributes to scarce literature that combines category management and sensory marketing. We suggest that sensory cues could be better harnessed for the use of category management. Second, comparing utilitarian and hedonic product categories is novel and provides a continuum in the discussion of emotional

relevance in scents (e.g., Herz et al., 2004a; 2004b). The results also challenge earlier research that found scents to affect purchase behavior but only among those consumers who make more planned purchases (Morrin & Chebat, 2005). Quoting Spence et al. (2014): “*There are also effects that appear to result from nonconscious associations that directly affect behavior.*” Hedonic orientation might provide a fruitful avenue for future research.

Managerially, the results suggest that retailers and category managers can use scents to mutually benefit an entire category or, alternatively, guide consumer behavior within a certain category. Hedonic food products are likely to benefit the most from olfactory cues. As with any research exploring new grounds, this study has several limitations. We only compared two focal categories in one supermarket. Future studies could broaden the scope to different kinds of food products and with differing levels of scent congruence.

Progress on the revised module food-related lifestyle instrument (MFRL) – new insights from three countries

Dawn Birch, Karen Brunsø, Klaus G. Grunert, Juliet Memery, Temesi Ágoston & Zoltan Lakner

Abstract

The food-related life style instrument has been applied in many different contexts to investigate food market segments of relevance to researchers as well as companies over the last decades (Brunso, Scholderer & Grunert, 2004), has cross-cultural validity (Scholderer, Brunsø, Bredahl & Grunert, 2004) and has been applied in many different contexts (e.g. Grunert, 2006; Thøgersen, 2017). Lately, in particular, two issues have been raised from many sides. First, that the instrument was too long (containing 69 items) and second, that some of the dimensions were outdated and needed revision in order to cover new developments in consumer preferences, attitudes and habits in the market.

This has resulted in the development of the new Modular Food Related Instrument (MFRL), and during spring 2017 a first data collection was carried out in Denmark using a new definition of three core dimensions from the original food-related lifestyle instrument. The three core dimensions; involvement with food, inspired by the Food Involvement Scale (Bell & Marshall, 2003), tradition vs. innovation in food, and food-related responsibility were expected to be able to segment across countries.

The first results from the Danish sample showed promising results, so in order to verify the MFRL further, 2 more samples have been collected in spring 2018, in Australia and Hungary.

As a result the revised modular food related lifestyle instrument has now been tested across three countries, Denmark, Hungary and Australia. Based on these three countries we have been able to further develop the core instrument for segmentation purposes on the three mentioned key dimensions: (1) Responsibility with food (CA = .85); Innovation with food (CA = .85); and Involvement with food (CA = .81), and as can be seen in Table 1, the three dimensions contain 5 items each, having a Cronbach Alpha of between .81 and .85 (See Table 1).

Next step was to make a segmentation in the three countries based on the three core dimensions, and to analyze results (here the hierarchical segmentation procedure Wards Method in SPSS was used). We have investigated cluster solutions from 3 to 6 clusters in each country, and are looking for similar patterns. For this abstract, we have selected a 5 cluster solution for all three countries, as this revealed quite similar segment profiles across countries. This may eventually change as more data is collected.

Table 1: Core Instrument

Factor/CA Loading

Responsibility (CA = 0.85)

I try to choose food produced with minimal impact on the environment .834 I try to choose food that is produced in a sustainable way .808 I am concerned about the conditions under which the food I buy is produced .751 It is important to understand the environmental impact of our eating habits .733 I try to buy organically produced foods if possible .699

Innovation (CA = 0.85)

I love to try recipes from different countries .817 Recipes and articles on food from other culinary traditions encourage me to experiment in .772 the kitchen

I look for ways to prepare unusual meals .730 I like to try out new recipes .715 I like to try new foods that I have never tasted before .705

Involvement (CA = 0.81)

Food and drink is an important part of my life .788 Eating and drinking are a continuous source of joy for me .744 Eating and food is an important part of my social life .701 I just love good food .695 Decisions on what to eat and drink are very important for me .657

In each of the countries we found the *Uninvolved Food Consumer*, that can be described as consumers generally unconcerned about food and they are also uninterested in relation to all three core dimensions across countries. What differs is the size of this segment: DK 11%, HUN 20 %, AU 24 %.

In each of the countries we also found the *Adventurous Food Consumer*, consumers that are generally involved in all aspects of food, the size of this segment across countries is the following: DK 33 %, HUN 19 %, AU 15 %.

We could also identify the *Conservative Food Consumer*, these consumers are not very interested in change and innovation, but look more for stability and well-known food. Across the three countries, we have the following size of this segment: DK 14%, HUN 9%, AU 7 %.

Also the profile of the *Careless Food Consumer* was identified in all three countries, these consumers are similar to the uninterested being not very into food in general, but are often slightly interested in technology: DK 24 %, HUN 23 %, AU 8 %.

The *Rational Food Consumer* could only be identified in Denmark and Hungary, these consumers are in general interested in food and cooking without an extremely high interest: DK 18 %, HUN 29 %.

Finally, we found a big segment of average consumers that may be called The *Moderate Food consumer*, as they in general have an indifferent attitude to most compared to the sample mean. In Australia this segment account for 46 % of the population.

For the revised add-on modules instrument, we sought to capture some contemporary issues reflected in food related lifestyles across the food planning cycle (i.e. Planning and shopping; Assessing product qualities; Storage and transportation; Preparation; Serving and consumption; Post-consumption behaviour) as well as influences on food choice. Based on the three countries surveyed, we have identified 21 validated scales that can be used as modules to supplement the core instrument for different research purposes. We are currently developing some new items where the original items did not perform well, which will be tested in three other country markets (USA, UK and NZ).

In this paper, we highlight two of these contemporary issues related to (1) how advancing technology has impacted on the ways we shop and share food-related experiences and (2) changing dietary practices such as snacking behaviour and weight management. First, with respect to the influence of advancing technology such as mobile devices and apps on planning and shopping we measured the factor *Use of technology for shopping* on three items: “Shopping apps assist me with food purchasing choices”; “I use recipe apps to generate shopping lists”; and “I use my smartphone to information when shopping”. During the serving and consumption stage, we sought to capture how mobile devices have influenced how consumers share their food-related experiences.

We measured the factor *Sharing Experiences* on three items: “I often take photos of food when dining out to share with friends on social media”; “I like to take photos of food cooked at home to share with friends on social media”; and “I take pictures of interesting and unusual food when travelling and share these on social media”. The Table 3 below shows the scale CA across countries and per country as well as means for the individual items.

Second, with a focus on how dietary practices have changed in recent times, we measured the factor *Weight management* (CA = .72) on three items: “I try to follow a diet to control my weight”; “I watch my calorie intake”; and “I look for products which are lower in sugar and/or salt”.

We were also interested in the increasing propensity to snack and measured the factor Snacking Behaviour (CA = .78) on three items: “I eat a lot of snacks rather than having set meals”; “I tend to snack during the day, which often means I am not hungry at meal times”; and “I eat a lot of small meals rather than keeping to fixed mealtimes”

Conclusions and future plans:

% Tot Agree

25.8 3.25 29.4 3.34 32.8 3.61

Den

2.44 a2.57 a3.10 a

Hun

3.51 b3.60 b3.84 b

Aus

3.80 c3.86 c3.89 b

As already shown, the new data from three countries confirm the core constructs' ability for analyzing food related segments, and many of the developed the add-on profiling modules work well and confirm expected psychometric properties (we have only chosen to present four of the add-on modules in this abstract). At later stages of our analysis they will contribute to strengthen the description of the individual segments.

Next step is data collections in the United States of America, United Kingdom and New Zealand with the aim of making further analysis of segments across countries, and to conduct a next revision of the add-on modules, as not all add-on modules worked satisfactory in the first three countries.

References:

Bell, R., & Marshall, D. W. (2003). The construct of food involvement in behavioural research: scale development and validation. *Appetite*, 40, 215-244.

Brunso, K., Scholderer, J., & Grunert, K. G. (2004). Closing the gap between values and behavior – a means end approach. *Journal of Business Research*, 57, 665-670.

Grunert, K. G. (2006). Future trends and consumer lifestyles with regard meat consumption. *Meat Science*, 74, 149-160.

Scholderer, J., Brunso, K., Bredahl, L., & Grunert, K. G. (2004). Cross-cultural validity of the food-related lifestyle instrument (FRL) within Western Europe. *Appetite*, 42, 197-211.

Thøgersen, J. (2017). Sustainable food consumption in the nexus between national context and private lifestyle: A multi-level study. *Food Quality and Preference*, 55, 16-25.

The Unit Of Analysis In Household Food Surveys - A WO/MAN United?

Tino Bech-Larsen & Gitte Lundberg Hansen

Abstract

In food-related, as in other, survey studies, the sampling and reporting procedures generally disregard the distinction between household and individual responses. Thus, the standard practice is to let one, typically adult, member represent the household without regard to the potential dissent to its other members. A few studies, however, measure within-household incongruences and conclude that the justification of the standard practice depends on the type of questions involved in the survey (Menon, et al. 1995, Grønhøj & Ölander, 2007; Seebauer, et al. 2017).

In the present study, the procedure of analysing differences between cohabitating couples is applied to an instrument (see Tsalis et. al., 2015) which measures perceptions related to *food quality*, i.e., buying motives, choice criteria and shopping habits, as well as to *co-production quality*, i.e., cooking competences and context factors. Also, this instrument (Tsalis et. al., 2015) relates food and co-production perceptions to the interviewees' willingness to pay and satisfaction with food related life. The inclusion of questions relating to such issues is common to many food-related preference and lifestyle surveys (cf. Grunert, et al., 2001), and it is hence relevant to study whether the application of the 'one interview fits' practice can be empirically justified for these types of questions.

Using cohabiting Danish couples (n=202) with any number of children below the age of 18 as the focus sample, this study compares male-female responses to a web-survey including the type of questions mentioned above. Couples were included regardless of the legal aspects of their relationship. Moreover, to account for potential selection problems in the focus sample, the responses of each partner were compared to responses from males (n= 421) and females (n= 482), who are living, although not together, in similar relationships.

The findings indicate that males and females living together give similar answers to most of the question types included in the survey. There are, however, more discrepancies for the questions related to shopping habits and WtP than to buying motives, choice criteria, cooking competences, context factors and satisfaction. As the results also show that females are generally more inclined to buying food in specialty stores and that they have higher WtP, it may indicate that the problem of basing household surveys on one interview is larger for issues and decisions with a stronger link to economic considerations than for questions related to motives and co-production.

Also, the analysis reveals that the differences between females and males from the focus sample are generally larger or equal to the general differences between males and females, and hence that the self-selection or household socialization problem is minimal. Thus, all in all, the results justify the validity of the method of assessing couples' perceptions of food and co-production quality by the administering the questionnaire to one adult in each household.

Still, the validity of applying one-person interviews to the measurement of the food and co-production quality perceptions of households, remains to be demonstrated. A possible way forward is to apply the principles of similarity assessments, i.e., from minimal comparability to weak identity, of structural linear models (cf. Grunert et al., 1997). Such analyses could be based on comparisons of households with different compositions, and/or on the comparison of data from interviews with couple-dyads (cf. Bateman & Munro, 2009) respectively cohabitating individuals.

References

- Bateman, I., Munro, A. (2009). Household versus individual valuation: What's the difference? *Environmental & Resource Economics*, 43, 119-135. doi:10.1007/s10640-009-9268-6
- Grunert, K. G., Brunsø, K., & Bisp, S. (1997). Food-related lifestyle: Development of a cross-culturally valid instrument for market surveillance. In L. Kahle, & C. Chiagouris (Eds.), *Values, lifestyles, and psychographics* (pp. 337–354). Mahwah, NJ: Erlbaum.
- Grunert, K. G., Brunsø, K., Bredahl, L., & Bech, A. C. (2001). Food-related lifestyle: A segmentation approach to European food consumers. In *Food, people and society* (pp. 211-230). Springer Berlin Heidelberg.
- Grønhøj, A. & Ölander, F. (2007). A gender perspective on environmentally related family consumption. *Journal of Consumer Behavior*, 6, 218-235
- Menon, G., Bickart, B., Sudman, S., & Blair, J. (1995). How well do you know your partner? Strategies for formulating proxy-reports and their effects on convergence to self-reports. *Journal of Marketing Research*, 32, 75-84. doi:10.2307/3152112
- Seebauer, S., Fleiß, J. & Schweighart, M. (2017) A Household Is Not a Person: Consistency of Pro-Environmental Behavior in Adult Couples and the Accuracy of Proxy-Reports. *Environment and Behavior* 49(6), 603 – 637.
- Tsalis, G., Mørk, T., & Bech-Larsen, T. (2015). *Kvalitetsindeks 2015 – Et instrument til kortlægning af fødevarer-forbrugernes kvalitetsopfattelser*. DCA Rapport nr. 69:

What Food Product Developers Need To Know Beyond the New Prototype

Hanli de Beer

Abstract

Purpose of the Research

The purpose of this paper is to discuss the complexity of different inter-related aspects of the new food product development process. Despite the focus on consumer driven product development, product success is not ensured. In another attempt to gain an understanding this phenomena this paper integrate factors that influence consumer buying behaviour in the consumer market. Consumer science research is an interdisciplinary field of study that integrate consumer behaviour in different contexts.

Background/Motivation/Support

New food products are essential for the survival of companies through competitive performance. It is however, complex and the chances for success of new products remaining on a grocery store's shelf for a year and longer decrease remarkably with time. Several factors, of which some are interrelated, determine and impact on the new product. All food products have life cycles and will eventually need to be replaced or rejuvenated. New products offer the opportunity for aggressive growth for existing companies and new markets can also be created (Fuller, 2011). Food packaging innovation is an important tool to attract new attention to an existing product. In addition focus on the consumers' buying behaviour in the retail environment through attentive packaging attributes (Wang, 2017).

Consumer driven food product development is well documented by several researchers (Linnemann et al., 2006; Sijtsema et al., 2002; van Kleef et al., 2005) and for processors it is fundamentally important to enhance a new product's success potential. Little et al. (2015) revealed a misalignment between processors and consumers as potential reason for product failure. Consumer research is one of the key elements during the idea generation stage of the development process aiming at consumers as end-users of the food. In parallel, packaging and presentation of the food forms part of prototype development. It is clear that three unique role playing aspects are involved throughout the new product development process, namely product idea and processing, product introduction and presentation to consumers, and the targeted consumer as end-user.

Methodology

Scholarly literature on consumer driven product development and factors influencing food choice behaviour was examined and will be discussed in this paper.

Findings

New food product development is mainly driven by food processing companies aiming at consumers as end-users to meet their expected needs with marketing and the retail environment

introducing the new products to end-users. The retailer as direct link to the consumer must ensure that food and other goods are acceptable, available and affordable to meet the needs of the consumer (Sullivan & Adcock, 2002) while marketing and promotion of new products focusing on the targeted group being essential for product success (Beckley et al., 2017). However, within the retail environment consumers' buying behaviour is another complex process which seems to cause unpredictable behaviour that impact on products' successes. A conceptual model is used to explain the interaction between different factors that contribute to the potential success of a new food product.

Food companies' objectives will direct product production aiming at their interpretation of consumers' needs and global food trends. Sensory evaluation often get ample attention during the development process ensuring product attributes meet consumer's needs and expectations. However, the complex nature of consumers' perceptions and experiences within certain situations require contextual interpretation of sensory research (Jaeger et al., 2017). Furthermore, cognition of consumers' needs, decision and buying behaviour are product specific and their reaction and behaviour in the retail environment must already get attention during the idea generation stage. Several processes and financial implications are involved during the prototype to manufacturing stages and successful market introduction and penetration is just as important. Consumers' buying behaviour is not merely only a case of evaluating a consumed product after a need for the product was identified and a product was chosen based on all available information.

Apart from different demographic factors are internal influencing factors such as motivation to choose a specific product. Internal and external influencing factors are interrelated for example motivational reasons to consume certain foods are often lifestyle and/or income related. Consumers' perceptions are personal phonemes and reaction to stimuli's for example food products are based on each individual's perceptions (Schiffman & Kanuk, 2014). The consumer as client's behaviour consists of a need recognition for a product, investigation of choices or variety while considering different product characteristics before they finally purchase and consume a product (Peter & Olsen, 2010).

Information regarding the product is important - especially with new innovative products as consumers will seek information and evaluate it to determine whether the use of the product will be beneficial before they will test trial the product (Solomon, 2018). It is therefore clear that the product developer should consider consumers' need, in parallel with buying and consumption behaviour when considering a new product. Consumer trends and actual needs for a product need to be determined beforehand. Assumptions on consumer's perceptions may result in product failure (Little et al., 2015), which further relate to purchase adoption behaviour and the potential perceived risk associated with food product especially in new unfamiliar categories.

Consumers' behaviour towards new food products are further affected by visual exposure to products external attributes, familiarity with various product attributes apart from the value of the product for the consumer. Consumers' choice for food products are influenced by the scope of the

product mix, the price of the product, the consumer's need for the product and its priority in a household (Mostert & du Plessis, 2007). It is thus clear that the product development team needs experts on product related aspects and an understanding of consumer food choice behaviour to enhance new product success.

Contributions to Theory and Practice

Consumer research during the idea generation stage of the new food product development process is essential to target specific consumer groups' needs while sensory evaluation ensure that specific product attributes are met. However, several factors in the retail environment influence consumers' behaviour during purchase and consumption which ultimately determine product success. A conceptual diagram demonstrating the interaction between product development and consumer behaviour will enhance understanding of this complex process.

Selected References

- Beckley, J. H., Foley, M. M., & Herzog, L.J. (2017). *Accelerating New Food Product Design and Development* (2nd ed.). Wiley & sons, Institute of Food Technologists.
- Fuller, G. W. (2011). *New food product development, from concept to marketplace* (3rd ed.). Boca Raton, Florida: CRC Press.
- Jaeger, S. R., Hort, J., Porcherot, C., Ares, G., Pecore, S., & MacFie, H. J. H. (2017). Future directions in sensory and consumer science: Four perspectives and audience voting. *Food Quality and Preference*, 56, 301–309.
- Linnemann, A. R., Benner, M., Verkerk, R., & van Boekel, M. A. J. S. (2006). Consumer-driven food product development. *Trends in Food Science & Technology*, 17, 184–190.
- Little, C., Aqueveque, C., & Aguilera, J. M. (2015). Producer–consumer misalignment as a possible cause for new food failure: empirical evidence from Chile. *Journal of International Food & Agribusiness Marketing*, 27, 228–253.
- Mostert, P. G., & Du Plessis, P. J. (2007). *Introduction to marketing management: a South African perspective*. Faerie Glen, SA: Mustard House Marketing.
- Peter, J. P. & Olson, J. C. (2010). *Consumer behaviour and marketing strategy* (9th ed. International edition). New York: McGraw-Hill.
- Schiffman, L. G., & Kanuk, L. L. (2014). *Consumer behaviour. Global and Southern African perspectives*. Cape Town: Pearson Education South Africa (Pty) Ltd.
- Sijtsema, S., Linnemann, A., van Gaasbeek, T., Dagevos, H., & Jongen, W. (2002). Variables influencing food perception reviewed for consumer-oriented product development. *Critical Reviews in Food Science and Nutrition*, 42(6), 565–581.
- Solomon, M. R. (2018). *Consumer behavior: buying, having and being* (12th ed.). England: Pearson Education.
- Sullivan, M., & Adcock, D. (2002). *Retail marketing*. London: Thompson Learning.
- van Kleef, E., van Trijp, H. C. M., & Luning, P. (2005). Consumer research in the early stages of new product development: a critical review of methods and techniques. *Food Quality and Preference*, 16, 181–201.

Do Danish Consumers Prefer an Organic Vegetarian Meal or a Non-Organic Meaty Alternative? Evidence From a Choice Experiment

Tove Christensen & Sigrid Denver

Abstract

Purpose

The paper aimed to analyse how different segments of consumers make trade-offs between the content of vegetables and meat in a meal and between organic and non-organic ingredients.

Background

Earlier studies have shown that concern about one's own health and the health of one's family emerges as one of the most important motives for buying organic food (e.g. Aertens, Verbeke, Mondelaers & Huylenbroeck, 2009; Schleenbecker & Hamm, 2013). Qualitative as well as quantitative studies have demonstrated a relation between organic purchases and healthy diet compositions (Lund & Jensen, 2008; Pelletier, Laska, Neumark-Sztainer & Story, 2013). In particular, a study by Denver and Christensen (2015) based on purchase data found Danish households with higher organic consumption to spend larger parts of their food budgets on fruits and vegetables and smaller parts on meat and fat/confectionary than households with lower organic budget shares. Thereby, the diets of organic consumers tended to be more in accordance with the official Danish Dietary Recommendations than non-organic consumers (Danish Veterinary and Food Administration, 2018a). This indicates that, whether or not organic products are intrinsically healthier than their conventional counterparts, there is a positive correlation between organic consumption and a healthy diet in terms of conforming with official dietary guidelines. The vast majority of economic analyses of consumers' preferences and willingness to pay for healthy food have focused on the healthiness of individual products just as most economic studies of organic food have been product oriented. At the same time, we know that most food products are included as components of a meal. The official guidelines concerning the composition of healthy meals recommend that a dinner plate should consist of 1/5 of animal products, 2/5 of vegetables and fruits, and 2/5 of bread, pasta, rice and potatoes (Danish Veterinary and Food Administration, 2018b). Thereby, the share of a dinner plate that is devoted to fruits and vegetables should be twice as large as the share devoted to meat. The dietary habits in a Danish context were investigated in Pedersen et al. (2015), who concluded that the Danish diet is too fatty and too sweet compared to the official guidelines and that an effective promotion of diets that accord with official guidelines is a challenging task. While previous studies indicate that there is a positive correlation between organic consumption and eating more fruits and vegetables and less meat products, we do not know whether such a positive correlation extends to preferences for composing a healthy meal. This apparent gap of knowledge led to our research question.

Methodology

The study was based on an online consumer survey conducted in Userneeds' Danish web panel. The first part of the survey consisted of a series of behavioral questions concerning stated consumption of fruits/vegetables and meat as well as stated organic purchasing habits. In the second part of the survey, consumers' preferences for the composition of an everyday meal were tested in a choice experiment. Here, respondents were asked to choose repeatedly between dishes of pasta and tomato sauce that differed from each other with respect to three attributes: 1) organic or non-organic ingredients, 2) contents of vegetables and meat, and 3) price. Prior to the survey, a pilot study involving 100 panel members was used to test the questionnaire. Firstly, the respondents' choices of meal in the pilot study provided priors for the marginal value of each attribute which were used to refine the design of the choice experiment. Secondly, an open question to the respondents in the pilot study provided valuable input concerning the understandability of the questions. The main survey was carried out in August 2017 among a sample that was representative for the Danish population according to gender, region, age and education. In total 505 respondents participated in the survey and the response rate was approximately 20 %. Two types of behavioural variables were used to categorize consumers in the analysis of their meal choices: The first type of variables addressed self-reported organic purchases of four categories of food (meat, fruit, vegetables, milk) while the second concerned the self-reported level of compliance with the dietary recommendations – i.e. consumption of fruits, vegetables and meat. Based on these six variables, we were able to test to what extent organic consumption as well as adherence to the official dietary advices could be used to explain consumers' preferences for meals in the choice experiment. As the variables concerning purchases of organics and dietary habits were suspected to be mutually correlated, a principal component analysis (PCA) was used to aggregate these variables into a smaller number of orthogonal components. Based on correlations between component loadings and individual respondents' answers, component scores were assigned to each respondent and included in the statistical model. The underlying economic behavioural model for the study was the attribute-based utility model suggested by Lancaster (1966) where the utility of a good can be described as a function of its characteristics. The RUT was introduced by Luce (1959) and re-invented in a statistical modelling context by Mcfadden (1974). Inclusion of the price enabled us to estimate the willingness to pay (WTP) for the meal being organic and for different combinations of meat and vegetables in the meal. In order to capture heterogeneity between consumers' preferences for the meal attributes, a latent class analysis (LCA) was used to allow estimation of marginal utilities of the meal attributes for different segments of consumers. More specifically, we used the LCA to group respondents into three segments with homogenous preferences for the meals and homogenous scores on the components identified in the PCA. This allowed for the estimation of class-specific consumer WTP for the composition of the meal and whether the meal was organic.

Findings

One component was identified in the PCA based on six behavioural variables. The component had high component loadings on self-reported purchases of organic products as well as on compliance with dietary recommendations. Hence, this component represented a dimension

characterized by covariation between eating organic food and having a high consumption of fruits and vegetables but a low consumption of meat. Three consumer segments were identified in the LCA and found meaningful to interpret. The segments differed in the following ways with respect to components scores and/or preferences for different combinations of the meals:

- *Committed consumers*: This segment was the smallest of the three segments. The committed consumers distinguished themselves by having relatively high WTP in the choice experiment for the meal being organic and for a healthy meal in terms of many vegetables and little meat. Respondents with high component scores were likely to belong to this segment.
- *Indifferent consumers*: Respondents in this segment were characterized by having low WTP for the meals being organic and for meals with many vegetables whereas an average consumer in this segment had the highest WTP for meaty meals of the three segments. Component scores were highly negative compared to scores in the *committed* segment. This indicated that *indifferent* consumers on average had a lower consumption of organics and lower degree of compliance with dietary guidelines. Thereby, this segment revealed itself to be rather indifferent to organic as well as to healthy consumption.
- *Ordinary consumers*: This segment was the largest of the three segments. Their WTP for the meal attributes that were offered in the choice experiments were situated between those of the *committed* and the *indifferent*. Hence, the *ordinary* respondents had low, but positive, WTP for organic production. They preferred meals with more vegetables and less meat compared to the *indifferent* but less so than the *committed*. Looking at the component scores, the *ordinary* segment was also situated between the other two segments.

Contribution to Theory and Practice

Overall, our study supported earlier findings – but also added new details to the understanding of organic consumption and dietary preferences by focusing on context of a meal. The results were obtained in a concrete setting of choosing a dish of pasta and tomato sauce. Consequently, more studies are needed to increase the robustness of the findings. Our findings supported the prevailing knowledge of a positive relation between consumption of organic and compliance with dietary guidelines. The three segments of consumers that were identified provided valuable input to a discussion of the size of different consumer segments as well as differences in consumers' trade-offs between the content of vegetables and meat in the meal and between organic and non-organic ingredients.

Firstly, the segment of *committed* consumers distinguished itself by finding it almost just as important that the ingredients were organic as the combination of meat and vegetables. For the other groups, the combinations of vegetables and meat were far more important than whether the meal was organic or not. Secondly, the segment of *committed* consumers had high WTP for meals with high proportions of vegetables whereas the *indifferent* consumers distinguished themselves by being very reluctant to consume a vegetarian meal. In particular, when the consumers had to choose between a vegetarian meal and a 100 % meaty meal, only the segment of *committed* consumers would prefer the vegetarian meal. At the same time, an average

consumer in all three segments preferred that a pasta-and-tomato-sauce dish contained some portion of vegetables compared to a meat-only meal. Thirdly, the results indicated that the majority of the consumers belonged to the segment of *ordinary* consumers and thereby had preferences in between the other two segments. Hence, the average respondent in the survey had positive preferences for organic meals over a non-organic meal and he/she preferred meals with a fairly equal combination of meat and vegetables over a vegetarian or 100% meaty meal. Moreover, we found that the majority of the Danish respondents seem to prefer a non-organic meal that includes meat instead of an organic vegetarian meal – but not all consumers.

We suggest that this knowledge can advantageously be used in the creation and marketing of new organic products. Our results indicate that if there is an overall aim to improve the diets of Danish consumers then a strategy to attract the segment of *committed* consumers could be to market new types of prepared meals with many vegetables (possibly vegetarian) and preferably organic. Another outcome of our results would be that if the aim is to improve the diets of *ordinary* or *indifferent* consumers, then aiming for less ambitious substitutions of meat for vegetables might be a good marketing strategy as these consumers seem to prefer that the meal includes some vegetables – but also meat.

Selected References

- Aertens, J., Verbeke, W. Mondelaers, K., Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: a review, *British Food Journal* 111(10), 1140–1167.
- Danish Veterinary and Food Administration (2018a). Alt om kost. [In Danish]. Accessed April 18, 2018. <http://altomkost.dk/deofficielleanbefalingertilensundlivsstil/de-officielle-kostraad/>
- Danish Veterinary and Food Administration (2018b). Alt om kost. [In Danish]. Accessed April 18, 2018. http://altomkost.dk/materialer/publikation/?tx_fvmpubdb%5BdataSheet%5D=63&cHash=0631d82cac1aae8e2c87d59cbdf2f2e5
- Denver, S., & Christensen, T. (2015). Organic food and health concerns: a dietary approach using observed data. *NJAS Wageningen Journal of Life Sciences*, 74-75, 9-15.
- Luce, R. D. (1959). *Individual choice behaviour*. New York: Wiley.
- Lund, T.B., & Jensen, K.O. (2008). Consumption of Organic Foods from a Life History Perspective: An Explorative Study among Danish Consumers, Country Report Denmark, Department of Human Nutrition, University of Copenhagen, Denmark.
- McFadden, D. (1974). *Conditional logit analysis of qualitative choice behavior*. In P. Zarembka (Ed.), *Frontiers in Econometrics* (pp. 105–142). New York: Academic.
- Pelletier, J.E., Laska, M.N., Neumark-Sztainer, D., Story, M. (2013). Positive Attitudes toward Organic, Local, and Sustainable Foods Are Associated with Higher Dietary Quality among Young Adults, *Journal of the Academy of Nutrition and Dietetics* 113(1), 127-132.

- Pedersen A.N., Christensen T., Matthiessen J., Knudsen V.K., Rosenlund-Sørensen M, Biloft-Jensen A., Hinsch, H., Ygil, K.H., Kørup, K., Saxholt, K., Trolle, E., Søndergaard, A.B. & Fagt S. (2015). *Dietary habits in Denmark 2011–2013*. DTU Food Report[In Danish].
- Schleenbecker, R. & Hamm, U. (2013). Consumers' perception of organic product characteristics. A review. *Appetite*, 420-9.

Chinese Urban Consumer's Perception of the Determinants of Food Safety

Thomas I. Wahl, James L. Seale, Jr. & Junfei Bai

Abstract

Households in 10 Chinese cities were asked to rank six food-safety indicators (venue, appearance, brand, certification, expiration date, price) in importance for five food groups including meat, milk, vegetables, fruit, and juice. The results suggest that different food-safety factors are important for different commodities. Consistent patterns are found in terms of which factor had the first and second highest probabilities of being chosen as the most important food-safety determinant within food categories. Venue and expiration date are the most important factors for meat, expiration date and brand for milk and juice, and price and venue for vegetables and fruits. Certification was not ranked as the number one or number two indicator of food safety for any of the five goods suggesting that either the household consumers do not trust the certifications or are not aware of the meanings of the certification labels.

Introduction

Food safety incidents in China have ignited demand for safer food and increased regulation of food products by the Chinese government (MacLeod, 2012; Lam et.al. 2014). In Chinese news are reports of sales of pork adulterated with the drug clenbuterol; pork sold as beef after being soaked in borax; rice contaminated with cadmium; arsenic-laced soy sauce; popcorn and mushrooms treated with fluorescent bleach; bean sprouts tainted with an animal antibiotic; and wine diluted with sugared water and chemicals. Even eggs have turned out not to be eggs at all but man-made concoctions of chemicals, gelatin and paraffin (LaFraniere, 2012). In the first half of 2012, China's State Administration for Industry and Commerce detected over 15,000 cases of inferior food and closed over 5,700 unlicensed food businesses (ChinaDaily, 2012). In response these incidents as well as others, the Chinese government revised the 2009 food safety law to impose stricter controls and supervision of food production and management (Sim and Yang, 2016). However, while some progress had been made, in 2016 the head of China's Food and Drug Administration reported there were over 500,000 food safety violations during the first 9 months (Stanway, 2016).

Given the prevalence of food safety incidents and violations as well as consumer's increasing concern over the safety of their food, what do consumers perceive determines the safety of their food? Do consumers perceive that food purchased at large supermarkets is safer than that from traditional wet markets? Do they trust their ability to evaluate the appearance of products? Does government certification of safety matter? Do certain brands elicit trust in the safety of their products? Does an expiration date on the product matter?

In this paper, how consumers determine the safety of meat, milk, fruit, vegetables, and juice products and how these determinants vary with economic and demographic variables are analyzed. The analysis uses a unique data set developed from a series of household surveys conducted in 10 cities in China. As part of the surveys, respondents were asked to rank the top

factors among purchase venue, certification, brand, price, appearance, and expiration date that they perceive as important in determining the safety of meat, milk, fruit, vegetable and juice.

The results suggest that the factor most important to determine food safety varies by food product. Venue is an important factor for meat. Date is important for milk. Price is important for vegetables and fruit. And, brand and date are important for juice. The results also suggest that economic growth, as well as demographic and education trends, will likely increase the extent to which consumers use these factors to determine food safety in the future.

Indicators of food safety

The general production process for safe food as described in (Notermans, et al., 1996)) suggests that the production of acceptable, safe food products is the result of good manufacturing processes (GMP), HACCP and regulations as well as consumer education. If food products are produced using good practices and following HACCP and regulatory guidelines, then consumers could be confident that these food products would be safe. However, China has experienced many incidents where apparently some portion of the GMP, HACCP, or regulatory processes were not effective (LaFRANIERE, 2012).

The production process can be categorized as having search, experience, or credence dimensions (Nelson, 1970; Darby and Karni, 1973). Search dimensions are those that consumers can determine at time of purchase, such as the appearance of an apple or meat. Experience dimensions are those that can be determined only after purchase such as the taste of or illness that results from consuming the pear. And credence dimensions are those that consumers cannot easily determine such as chemical or microbiological hazards unless they directly cause illness, such as long term health effects from pesticides or chemicals applied to pears. Credence dimensions may also reinforce perceptions of quality based upon place of purchase or branding such as certain stores providing consistently better quality or safer products (Grunert, 2002).

Many studies have examined consumer's willingness to pay for higher quality or safer foods (Li, et al., 2004, McCluskey, et al., 2005, Ortega, et al., 2011, Wang, et al., 2008). In general, these studies find that consumers were willing to pay a premium for higher quality and/or safer food. Bai, et al. (2007) assess food safety accidents in China in 2003 and 2004 and find that they could be attributed to either contaminated raw materials or insufficient sanitation control during processing. They also examine government mandated compulsory food safety admittance systems and voluntary food safety assurance systems such as Green Food and organic foods. They find that the compulsory system is inefficient and perhaps ineffective particularly for small food processors. The use of voluntary food safety assurance systems area found to be rapidly increasing as a way for food companies to compete in the marketplace although it is not clear how consumers perceive these systems. Zhang, et al., 2010 find that consumers evaluate extrinsic factors to assess the safety of food products. They find that brand and purchase venue are ranked as the first two important safety indicators in fluid milk purchases.

Data

The data in the present study were collected by surveying 2,027 urban households in ten cities from 2009 to 2012. These cities and number of households surveyed for this analysis are

Nanjing (246HH) in Jiangsu province, Chengdu (208HH) in Sichuan province, Xi'an (215HH) in Shaanxi province, Shenyang (207HH) in Liaoning province, Xiamen (149HH) in Fujian province, Taiyuan (202HH) in Shanxi province, Harbin (212HH) in Heilongjiang province, Taiyuan (202HH) in Shanxi province, Nanning (190HH) in Guangxi province, Taizhou (197HH) in Zhejiang province, and Lanzhou (201HH) in Gansu province. For the sake of regional comparison, the surveys were conducted between July and September. These cities were chosen to be geographically dispersed and representative of the upper tier cities in China (Figure 1).

Our survey participants are a stratified random sample of the households participating in the Urban Household Income and Expenditure (UHIE) survey conducted by the National Bureau of Statistics of China (NBSC). The UHIE is a national survey, which provides the primary official information on urban consumers' income and expenditures. The data from the UHIE survey have been widely used by scholars for food consumption and expenditure research but does not include any information of consumer attitudes towards or perceptions of food safety.

Questions pertaining to food safety area were asked with in-house and face-to-face interviews with the person most familiar with the food shopping and food preparation in each household. Respondents are asked to rank the most important, next most important, and third most important (1,2,3) of six factors in determining safety of meat, milk, vegetables, fruits, and juice. The six factors to be ranked are purchase venue, appearance, brand, certification, expiration date and price. To empirically identify and investigate the determinants of consumers' ranking behavior, detailed information on demographics and socioeconomics of the household is also collected during the survey.

The raw number of respondents that rank each factor as most important is presented in Table 1. For example, of the 246 households surveyed in Chengdu, 59 (28%), 54 (26%), 75, (36%) and 64 (31%) rank venue as the most important factor in determining the safety of meat, milk, vegetables, and fruit, respectively. More than 25% of Chengdu households rank certification as most important for juice. Overall, venue or price are ranked as most important for meat, vegetables and fruit. Certification and price are ranked as most important for milk. There is less consensus for juice with venue, certification, or price being ranked as most important.

When looking across the cities for each commodity, venue or price were generally most important for meat, vegetables, and fruit. Brand, certification, or price were generally ranked as most important for milk and juice.

Methodology

Following (Zhang, et al., 2010), a Rank Ordered Logit Model (ROLM) is used which is a generalization of the conditional logit model for ranked data (Beggs, et al., 1981). The ROLM model can also be used when individuals do not rank some of the least-preferred items (Beggs, et al., 1981, Zhang, et al., 2010).

As shown in (Zhang, et al., 2010), the ROLM can be derived from an underlying random utility model (Allison and Christakis, 1994, Beggs, et al., 1981) where each respondent, i , ranks the most important, next most important and the third most important factor to determine food

safety. Let U_{ij} , $j = 1, \dots, J$ be the unobserved utility that respondent i derives from the j th factor where i is assumed to rank factor j higher than factor k whenever $U_{ij} > U_{ik}$. Each U_{ij} is composed of sum of two parts, the systematic component part, μ_{ij} , and a random component, ϵ_{ij} . The μ_{ij} are numerical

quantities that indicate the degree that respondent i prefers item j over other items (Allison and Christakis, 1994). When the choice is between item j and item k , the odds of choosing j over k is $\exp\{\mu_{ij} - \mu_{ik}\}$.

Following (Zhang, et al., 2010), μ_{ij} is expressed as $\mu_{ij} = \alpha_j + \sum_{l=1}^L \beta_{jl} X_{il}$,

where α_j is interpreted as the differences in log odds of ranking factor j over the reference factor, and β_{jl} can be interpreted as the effect of a one-unit change in the l th explanatory variable on the log odds. The X_{il} ($l = 1, \dots, L$) are the individual's l th characteristics that vary across respondents but are fixed across factors and include, presence of children, adolescents, and seniors as well as income and education level (Table 2). Note that one factor is dropped due to identification issues so that all estimates for j and jl are relative to the reference factor. Predicted probabilities for each alternative are calculated using the (StataCorp, 2009) routine `aspr` value.

Results

For identification, the determinant price is omitted from the ROLM, and the model is estimated with maximum likelihood. Accordingly, all coefficient estimates are relative to choosing price as the number one indicator of food safety (Table 3). For example, the coefficients on venue for meat, vegetables, fruit, and juice are significant with two being positive and two negative. These coefficients indicate that for meat and juice, venue is more likely to be chosen than price as the most important indicator of food safety while price is more likely to be chosen for than venue for vegetables and fruit.

For meat venue, appearance, and expiration date are more likely to be chosen relative to price and the most important indicator of food safety. Brand and certification are less likely to be chosen relative to price. For milk, appearance, brand, and expiration date are more likely to be chosen relative to price while venue and certification are less likely to be chosen than price. For vegetables and fruit, venue, appearance, brand, certification, and expiration date are less likely to be chosen than price as the most important indicator. Venue, brand, and expiration date are more likely to be cited as most important for juice relative to price and appearance is less likely.

The coefficients of the interactive terms of the food-safety factors with kids, adolescents, seniors, income and education are also relative to price as the most important indicator. Of the interactive terms with these variables, those with income and education are most often significantly different than zero. Households with higher income are more likely to choose venue or date than price as an indicator of food safety for meat. Income also positively affects the choice over price of venue for milk and juice; appearance for meat; brand for meat, milk, and juice; certification for meat, milk, and vegetables; and date for meat, milk, vegetables, and juice. Education also positively affects the choice of an indicator of food safety relative to price. Education positively affects the choice over price of venue for meat, milk, vegetables, fruit, and

juice; brand for meat and milk; certification for meat and juice; and education for milk, vegetables, fruit, and juice. Kids, adolescents, and seniors have sometimes significant but varying role in choosing a factor other than price as an indicator of food safety. Children in the household tended to have a significant effect on milk and juice. Adolescents tend to have a positive effect on meat, fruit, and juice relative to price, while having a senior in the household significantly increases the importance of expiration date relative to price.

City effects also have a significant effect on choice of a factor over price in many instances as indicated by the interactive terms including cities¹. Generally, the interaction term for cities tend to have a significant negative effect for venue and brand on meat, milk, and juice; and appearance on meat; expiration date on meat, milk, vegetables, fruit, and juice.

The ROLM with socioeconomic and city-effect variables has a large number of interactive terms and that makes it difficult to access the quantitative importance of the six food-safety factors from a quick examination of the coefficients reported in Table 3 (Beggs et al., 1981). To access the importance of these factors, probability **estimates** of each factor being chosen first are calculated and reported in Table 4 with these probabilities calculated taking into account the effects of the significant interactive terms.

Of the households surveyed, venue, except in Xiamen, was estimated to have the highest probability of being chosen as the most important food-safety indicator for meat. Appearance and expiration date had the second highest probability of being chosen for meat. For milk, expiration date has the highest estimated probability of being chosen first in all cities and brand has the second highest probability level, except in Taiyuan.

For vegetables and fruit, price has a higher probability of being chosen first as an indicator of food safety all cities except Chengdu where venue was ranked highest and price was second. Venue or appearance was consistently ranked second for the other cities. For juice, brand and expiration date have the highest and second highest probability, respectively, except in Taiyuan, Taizhou, and Nanning where expiration date has the highest probability and brand or venue has the second highest probability.

Conclusions and Implications

In 10 Chinese cities 2027 households were asked to rank six food-safety indicators in importance for five food groups. A ROLM that included socioeconomic and city-effect terms is fit to the household data. The result suggests that different food-safety factors are important for different commodities. That being said, consistent patterns are found in terms of which factor had the first and second highest probabilities of being chosen as the most important food-safety 1. Nanjing was not included to avoid singularity. determinant within food categories. Venue and expiration date are the most important factors for meat, expiration date and brand for milk and juice, and price and venue for vegetables and fruits.

In no case is certification predicted to be ranked as the number one or number two indicator of food safety for any of the five goods. The Chinese government is highly supportive of the certification program, but these findings suggest that either the household consumers do not trust the certifications or are not aware of the meanings of the certification labels. This does not mean that certification cannot play an important part as a reliable food-safety indicator, but

that it may take more time for consumers to trust the system or more education of consumers as to the meanings of the certification labels.

References

- Allison, P.D., And N.A. Christakis. 1994. "Logit Models For Sets Of Ranked Items." *Sociological Methodology* 24:199-228.
- Bai, L., C. Ma, S. Gong, And Y. Yang. 2007. "Food Safety Assurance Systems In China." *Food Control* 18:480-484.
- Beggs, S., S. Cardell, And J. Hausman (1981) "Assessing The Potential Demand For Electric Cars. ." In., *Journal Of Econometrics*, Pp. 1-19.
- Chinadaily (2012) "China Vows To Markedly Improve Food Safety |Policy And Regulation |Chinadaily.Com.Cn." In., Chinadaily.Com.Cn.
- Grunert, K.G. 2002. "Current Issues In The Understanding Of Consumer Food Choice." *Trends In Food Science & Technology* 13:275-285.
- Lafraniere, S. (2012) "Despite Government Efforts, Tainted Food Widespread In China - Nytimes.Com." In Nytimes.
- Lam, Hon-Ming, Justin Remais, Ming-Chiu Fung, Liqing Xu, and Sameul Sai-Ming Sun. 2013. "Food Supply and Food Safety Issues in China." *Lancet* 2013 Jun 8; 381.
- Li, Q., J.J. McCluskey, And T.I. Wahl. 2004. "Effects Of Information On Consumers' Willingness To Pay For Gm-Corn-Fed Beef." *Journal Of Agricultural And Food Industrial Organization* 2:1-16.
- Macleod, C. (2012) "Chinese Despair At Endless Food-Safety Scares – USAtoday.Com." In USAtoday.
- Mccluskey, J.J., K.M. Grimsrud, H. Ouchi, And T.I. Wahl. 2005. "Bovine Spongiform Encephalopathy In Japan: Consumers' Food Safety Perceptions And Willingness To Pay For Tested Beef." *Australian Journal Of Agricultural And Resource Economics* 49:197-209.
- Notermans, S., G.C. Mead, And J.L. Jouve. 1996. "Food Products And Consumer Protection: A Conceptual Approach And A Glossary Of Terms." *International Journal Of Food Microbiology* 30:175-185.
- Ortega, D.L., H.H. Wang, L. Wu, And N.J. Olynk. 2011. "Modeling Heterogeneity In Consumer Preferences For Select Food Safety Attributes In China." *Food Policy* 36:318-324.
- Sim, Andrew, and Yilan Yang. 2016. "China: An overview of the New Food Safety Law." *Food Safety Magazine*, April 19, 2016 Downloaded from <https://www.foodsafetymagazine.com/enewsletter/china-an-overview-of-the-new-food-safety-law/>
- Stanway, David. 2016. "China Uncovers 500,000 Food Safety Violations in Nine Months." *Reuters*, December 24, 2016. Downloaded from <https://www.reuters.com/article/us-china-food-safety/china-uncovers-500000-food-safety-violations-in-nine-months-idUSKBN14D046>.
- Statacorp. 2017. "Stata Statistical Software: Release 14." In. College Station, TX, Statacorp Lp.
- Wang, Z., Y. Mao, And F. Gale. 2008. "Chinese Consumer Demand For Food Safety Attributes In Milk Products." *Food Policy* 33:27-36.

Zhang, C., J. Bai, B.T. Lohmar, And J. Huang. 2010. "How Do Consumers Determine The Safety Of Milk In Beijing, China?" *China Economic Review* 21:S45-S54.

Generic Promotion of Sorghum for Food and Industrial Uses in the United States

Gary W. Williams

Abstract

Known primarily as a feed grain for livestock in most developed countries, sorghum is an important staple food across much of Africa, Asia, and Latin America. Sorghum is an ingredient in a variety of foods in these regions of the world from tortillas to breads, cakes, biscuits, noodles and pasta, porridges, and a wide variety of breakfast and snack food items. Sorghum is also used in fermented and unfermented beverages and can be steamed, popped, flaked or consumed as a whole grain. Sorghum syrup, produced from the stalks of the sorghum plant, is used in many areas of the world as an alternative sweetener to produce whiskey and rum type products.

Globally, over half of all sorghum produced each year is used for human consumption. In contrast, sorghum has been largely unknown as a food in the United States and most other developed countries. In recent years, however, sorghum has been gaining ground in the United States as a gluten-free, non-GMO input to food products traditionally made with wheat and other grains. Sorghum was designated as the James Beard Foundation's "food trend crop of the year" in 2017. Sorghum is also used by U.S. agribusinesses as an input into the production of a variety of consumer goods including, ethanol, pet foods, insulation, cat litter, and more. Sorghum now can be found in more than 350 product lines in the United States.

The utilization of sorghum as a food product or for other non-feed (industrial) uses accounted for only one to two percent of the total U.S. domestic use of sorghum in the 1970s. Feed use accounted for 97-98% of U.S. domestic sorghum use in those years. Over the years, however, the share of sorghum going into food and industrial products in the United States has grown steadily to 47% of domestic use in 2016/17 while feed use has dropped to 53% over the same period.

Growth in the use of sorghum in the United States, including food use, has been promoted by the producer-financed United Sorghum Checkoff Program (USCP) since its establishment in 2008. How much of the growth of the food and industrial use of sorghum in the United States can be attributed to the generic promotional efforts of the USCP? Has the investment been profitable for sorghum producers? This paper addresses these questions.

The USCP is a mandatory U.S. generic promotion program created in 2008 by the Sorghum Promotion, Research, and Information Order under authority of the Commodity Promotion, Research, and Information Act of 1996. The USCP is funded by assessments that all sorghum producers must pay on their sales of sorghum. Like many such generic commodity promotion programs, the USCP promotes the demand for sorghum downstream in wholesale and retail markets under the assumption that sufficient benefits will migrate upstream to the producers who paid for the promotion to more than cover their collective investment in the generic promotion activities funded. Thus, the goal of the program is to maintain and expand U.S. sorghum markets to enhance the profitability of U.S. sorghum producers. The USCP promotion programs began just as sorghum started to gain popularity in food products in the United States because of its gluten-free food and non-GMO properties.

The first of the two central questions of this study (whether the USCP generic promotional activities have enhanced the food and industrial demand for sorghum) is analyzed with a structural econometric model of the U.S. demand for sorghum for food and industrial uses. The estimated model accounts for 98% of the variation in sorghum use for food and industrial purposes over the 1975/76 to 2016/17 period of analysis. The econometric results indicate that USCP expenditures to promote renewable and high-value uses for sorghum have had a positive and statistically significant impact on U.S. sorghum food and industrial demand. The results suggest that a one percent increase in USCP funds for renewables and high-value market promotion generated an increase of 0.036% in the demand for sorghum for food and industrial purposes in the year of expenditure and a 0.072% increase over two years on average over the 2008/09 to 2015/16 period of analysis.

The second of the two central questions of this study (whether sorghum producers have benefitted from USCP program expenditures to promote sorghum food and industrial demand) is addressed through a simulation analysis in which the econometric model was used to simulate the level of U.S. sorghum food and industrial demand, price, and sales, and producer profit under two alternative assumptions regarding sorghum checkoff expenditure levels. In the first simulation scenario, USCP expenditures to promote U.S. food and industrial demand for sorghum were set to their actual or historical values in the econometric model (the “*With Expenditures*” scenario). In the second simulation scenario, the expenditures were set to zero and the model was simulated again over the period of analysis (the “*Without Expenditures*” scenario). Differences in the solution values between the two scenarios are direct measures of the effects of the programmatic activities of the USCP board over time. To insure price response in the simulations from the promotion-induced changes in demand, we used an estimate of the sorghum supply elasticity reported by Capps, Williams, & Welch (2017) in the simulation analysis. To insure a plausible range of the resulting estimates of demand, price, sales, and the resulting producer surplus or profits, we conducted three *Without Expenditures* scenario simulations assuming supply elasticities at the mean, one standard deviation above the mean value, and one standard deviation below the mean.

The simulation results then were used to calculate the sorghum producer benefit-to-cost ratio (BCR) (i.e., the *average* return per dollar spent on the checkoff program) from the promotion of U.S. sorghum food and industrial demand. The BCR is calculated as the additional producer surplus or profits realized by producers as a result of the USCP expenditures on sorghum food and industrial demand promotion over time (from the simulation results) net of the checkoff expenditures divided by the level of checkoff expenditures made to generate those additional revenues

The overall conclusion of the study is that the USCP played a statistically significant role in the growth of the food and industrial demand for sorghum in the United States and that the return to growers has been positive. More specifically, the study concludes:

- The positive and statistically significant effects of USCP promotion programs on U.S. food and industrial demand for sorghum in any given year tend to persist over a two-year period. The log-run promotion elasticity was estimated at 0.0718.

- The USP promotion program increased the farm revenue from the sales of sorghum for food and industrial purposes by 4.3% to 4.4% and added 0.9% to 1% to total sorghum revenues at the farm level annually on average since the inception of the USCP in 2008.
- Sorghum producers earned a return of between \$5.83 and \$7.12 in producer surplus or profit per dollar spent on promotion on average over the period of analysis depending on the elasticity of supply used.
- Opportunities for enhancing producer profitability appear to exist in promoting the use of sorghum for the production of ethanol, gluten-free products, pet foods, aquaculture, and renewable chemicals in the United States. Efforts could also focus on the visibility of sorghum not only as a healthy choice for cooking and baking but also as a gluten-free nutritious grain.

References

Capps, Jr., O., Williams, G.W., & Welch, J.M. (2017). Producer return on investments in sorghum research, promotion, and information: An updated analysis. Research report for the United Sorghum Checkoff Program Board, College Station, Texas, September.

Consumer perspectives on the Senior Farmers' Market Nutrition Program (SFMNP): evidence from west Tennessee and Puerto Rico

Rachna Tewari, Joey Mehlhorn, Carmen Alamo Gonzalez & Franklin Roman Martinez

Abstract

Federal nutrition assistance programs at farmers' markets are considered effective tools to support direct marketing of local produce, and to increase consumer access to healthy food in low-income communities. Preliminary review of existing literature suggests lack of significant research regarding the effectiveness of the Farmers' market nutrition programs (FMNP) both in west Tennessee and Puerto Rico. To ensure continued federal and state funding, and for expansion and support of these programs, it is vital to evaluate the effectiveness of these programs and understand recipients' perspectives about the various elements of the program. This research consisted of a preliminary exploratory survey for participating FMNP senior recipients at the farmers' markets in the regions of west Tennessee and Puerto Rico. Survey questionnaires were administered to participating FMNP recipients at the farmers' markets in west Tennessee and Puerto Rico, in cooperation with the respective state agencies (Tennessee Department of Health, Puerto Rico Department of Agriculture and Puerto Rico Department of Family). The results from the study suggest that while most recipients in both locations consider the program to be working effectively, their perspectives differed in terms of produce quality, operation of the farmers' markets and willingness to spend money on farmers' market produce. Study findings can be used to provide policy recommendations to expand and improve the existing farmers' market nutrition program, as well as to enhance direct marketing of local produce.

Background: Federal nutrition assistance programs at farmers' markets supported by the USDA are considered effective tools to support direct marketing of local produce, and to increase consumer access to healthy food with a focus on food deserts and low-income communities (Kim, 2011; Byker et al., 2012). These programs including the Women Infant and Children Farmers' Market Nutrition Program (WIC FMNP) and the Senior Farmers Market Program (SFMNP) provide vouchers to low-income individuals to purchase fruits and vegetables at farmers' markets. According to the Food and Nutrition Service (USDA, 2015), in 2014, the state of Tennessee received a total of \$76,830 in FMNP grants, and recorded 8,379 participating recipients, 90 authorized farmers, and 20 authorized farmers' markets. Puerto Rico received a significantly higher FMNP grant amount of \$1,506,793, and recorded 69,315 participating recipients, 50 authorized farmers, and 82 authorized markets (to receive FMNP coupons). The primary goal of this program is to provide locally grown fruits, vegetables, and herbs to families with limited resources. The program supports and includes only the fruits, vegetables, and herbs grown in the respective states, thereby providing support to local farmers. Preliminary review of existing literature suggests lack of significant research studies regarding the effectiveness of the FMNP both in west Tennessee and Puerto Rico. To ensure continued federal and state funding, as

well as for the expansion and support of these programs, it is vital to evaluate the effectiveness of these programs from consumers' perspectives. Also, the low enrollment numbers of authorized farmers participating in these programs create a need for further research for expanding these programs among small farmers in the regions of west Tennessee and Puerto Rico. An exploratory study for these programs can also potentially be a useful input for health promoting state level initiatives such as obesity reduction among seniors and children in the states of Tennessee and Puerto Rico.

Purpose of the Research: The primary purpose of this research was to evaluate consumer perspectives for Farmers' market nutrition programs sponsored as part of federal nutrition assistance for low-income seniors. This was achieved by conducting preliminary exploratory surveys for participating Farmers' market nutrition programs senior recipients at the farmers' markets in the regions of west Tennessee and Puerto Rico. This study also analyzed the effect of produce quality and factors involving farmer's market operations on recipient willingness for continuing to shop at farmers' markets in the absence of farmer market coupons.

Methodology: The specific methodology used for this research utilized a preliminary exploratory survey for participating SFMNP recipients at the farmers' markets in the regions of west Tennessee and Puerto Rico. In west Tennessee, the survey data was obtained in cooperation with the Tennessee Department of Health, during July and August of 2016, when the vouchers are distributed to the recipients. In Puerto Rico, the data collection was conducted in cooperation with established research personnel at the University of Puerto Rico's Department of Agricultural Economics and Rural Sociology, Puerto Rico Department of Agriculture and Puerto Rico Department of Family during May of 2017. After the completion of data collection from the two study regions, the results were compiled, and a comparative analysis was drawn on the status and effectiveness of the FMNP in these regions.

Findings: In response to questions on nutritional impacts senior recipients in both locations felt that their consumption of fresh fruits and vegetables increased due to the SFMNP, and this increase was more evident in the west Tennessee region (Table 1). Respondents also suggested that the quality of produce in the farmers' markets at both locations was better when compared to grocery stores (Table 2). In comparison to west Tennessee, more respondents in Puerto Rico felt that weather, as well as hours and days of operation of the farmers' market affected their shopping frequency at the market (Table 3). Further, responses on questions related to expenditure on farmers' market produce suggested that more recipients in west Tennessee spent money in addition to the coupons when compared to recipients in Puerto Rico (Table 4). Statistical analysis for the impact of operational factors affecting recipients' willingness to continue to shop at the farmers' market in the absence of SFMNP coupons (dependent variable) are provided in Tables 5 and 6 for the respective locations of study. It was observed that none of the factors (produce quality, operational hours or days, and weather) had statistically significant impacts on the dependent variable in west Tennessee. In the case of Puerto Rico, it was observed that a decline in produce quality and days the market was open both negatively affected recipients' willingness to continue to shop at the farmers' market in the absence of SFMNP coupons.

Table 1. Recipient responses for questions on nutritional impacts due to the SFMNP

Due to the SFMNP	I or my family went to farmer's market for the first time	Ate more fresh fruits and vegetables this summer than usual	Plan to eat more fresh fruits and vegetables all year round	Learned a new way to prepare or cook fresh fruits or vegetables	Learned a new way to store fresh fruits or vegetables to prevent spoilage	Bought a fresh fruit or vegetable that I had never tried before
Puerto Rico	6%	97%	82%	76%	64%	15%
west Tenn.	29%	94%	88%	82%	59%	41%

Table 2. Recipient responses for questions on quality of produce in the farmers' markets

	How did quality of fruits and vegetables at the farmers' market compare to their quality at your grocery store? (worse)	How did quality of fruits and vegetables at the farmers' market compare to their quality at your grocery store? (same)	How did quality of fruits and vegetables at the farmers' market compare to their quality at your grocery store? (better)
Puerto Rico	3%	21%	64%
west Tenn.	3%	12%	82%

Table 3. Recipient responses on questions related to operation of the farmers' markets

	Did the hours the market was open keep you from shopping as often as you would like?	Did the days of the week the market was open keep you from shopping as often as you would like?	Did the weather keep you from shopping as often as you would like?
Puerto Rico	30%	33%	30%
west Tenn.	18%	12%	6%

Table 4. Recipient responses on questions related to expenditure on farmers' market produce

	Did you spend money in addition to Farmers' Market coupons?	Will continue to shop at farmers' markets, in the absence of farmer market coupons.	After you spent all of your farmer's market coupons, did you go back to shop at the market?	Overall, are you satisfied with the Farmers' market coupon program ?
Puerto Rico	27%	88%	42%	100%
west Tenn.	62%	79%	56%	100%

Table 5. Factors affecting recipients' willingness to continue to shop at the farmers' market in west TN even without SFMNP coupons

Variable	D F	Estimate	Standard Error	t Valu e	Pr > t

Intercept	1	2.95625E-15	0.41062	0.00	1.000 0 ^{ns}
Produce quality worse	1	0.74000	0.79623	0.93	0.360 9 ^{ns}
Produce quality same	1	0.79000	0.44225	1.79	0.085 3 ^{ns}
Produce quality better	1	0.75250	0.42026	1.79	0.084 6 ^{ns}
Hours of market	1	0.23500	0.25201	0.93	0.359 3 ^{ns}
Days market was open	1	-0.01250	0.34047	-0.0 4	0.971 0 ^{ns}
Weather	1	0.26000	0.54475	0.48	0.637 0 ^{ns}

Dependent Variable: Will continue to shop at farmers' markets, even without SFMNP coupons to spend *significant at $\alpha=0.05$, **significant at $\alpha=0.01$, ns=not significant

Table 6. Factors affecting recipients' willingness to continue to shop at the farmers' market in Puerto Rico even without SFMNP coupons

Dependent Variable: Will continue to shop at farmers' markets, even without SFMNP coupons to spend

Variable	D F	Estimate	Standard Error	t Valu e	Pr > t
Intercept	1	1.10304	0.14627	7.54	<.0001* *
Produce quality worse	1	-1.10304	0.30397	-3.63	0.0012**

Produce quality same	1	-0.03560	0.19115	-0.19	0.8537 ^{ns}
Produce quality better	1	-0.01257	0.15794	-0.08	0.9372 ^{ns}
Hours of market	1	-0.03491	0.12583	-0.28	0.7837 ^{ns}
Days market was open	1	-0.30676	0.10526	-2.91	0.0072 ^{**}
Weather	1	-0.20609	0.12072	-1.71	0.0997 ^{ns}

*significant at $\alpha=0.05$, **significant at $\alpha=0.01$, ns=not significant

Contributions to Theory and Practice: This research provides an initial foundation for continued in-depth analysis of the FMNP programs in the regions of west Tennessee and Puerto Rico by using survey instruments. Based on exploratory results from this study, structured surveys can be designed for participating recipients and farmers. These structured surveys will help build policy recommendations at the regional and state level for expanding the visibility of fresh farm products from farmers to promote health benefits among recipients, as well as a platform for farmers to improve their distribution, and marketing network. Also, the recipient surveys can focus on nutrition and dietary information to evaluate the efficacy of federal nutrition assistance programs on dietary intake of recipients. These results will also benefit the rural community in the study regions, particularly in west Tennessee, where the program has definite potential for expansion and could benefit more recipients and farmers if additional funding could be secured to cover administrative costs.

Selected References

Byker, C., Shanks, J., Misyak, S., & Serrano, E. (2012). Characterizing farmers' market shoppers: A literature review. *Journal of Hunger & Environmental Nutrition*, 7, 38-52.

Kim, S. (2011, October 3rd). *USDA supports diverse food access through Farmers Market Promotion Program grants*. Retrieved from: <http://www.usda.gov/wps/portal/usda/usdahome?contentid=2011/10/0441.xml>

USDA Food and Nutrition Service (2015). Programs and Services. Food and Nutrition Service. Retrieved from: <http://www.fns.usda.gov/programs-and-services>

Understanding Farm to School Program Activity Among Private Schools in the Nashville MSA

Garrett Harper, Joey Mehlhorn, Rachna Tewari & Ross Pruitt

Abstract

Background:

The history of farm to school programs is a relatively new one. Until recently, communities and their institutions relied primarily on food sourced from close proximity to the point of final consumption. With the increased technology used on farms, improved transportation networks, and other economic transformations, food origin and final destinations now can be quite distant from one another. Mandatory educational requirements for U.S. children and youth have been ubiquitous for well over a century. The delivery of education to students represents one of the nation's largest endeavors. The proliferation of schools, coupled with high levels of urbanization, have made one room rural schoolhouses the exception and large urban school districts the norm. Additionally, recent decades have seen growth in private K-12 schools with a wide range of appeal and specialization. Simultaneously, farming has become less visibly connected with young persons in many urban settings, whether in public or private schools.

The benefits of accessing locally produced products are many, ranging from economic to nutritional to educational. What has often been a barrier to bridging this divide and relying instead on food sourced through traditional mass market supply chains has been a lack of alternative. With the emergence of the USDA Farm to School Program, schools in recent years have been able for the first time to pursue an alternative. Popular interest in healthy eating, sustainable development and diversified experiential learning have all combined to support a growing national interest in farm to school activity.

A major focus of farm to school programs since their inception has been to enhance the nutritional quality and variety of food used in school settings. Research over the years has addressed shortfalls and issues relative to food offerings in U.S. schools. In addition to economic and nutritional advantages for schools and their cafeteria offerings, involvement of students in farm to school programs are credited with promotion of enhanced overall academic achievement in K-12. Overall, farm to school programs can function as activities to connect students to agricultural and environmental related activities in interesting and meaningful ways. Farm to school programs can span a wide continuum of activities, including school gardens, maintaining animals and insects, culinary initiatives, and use and sale of products by schools. Most typically, the programs involve serving regionally and locally produced food products in school cafeterias. Programs incorporating school gardens further provide students with understanding of agriculture and the environment along with improved interpersonal skills and behavior. Research has also shown that students can demonstrate a greater willingness to try

new foods and explore healthier options when holistic offerings of local food and school gardens are present (Evans et.al, 2012; Morris, 2002; McAleese, 2007).

While schools for much of the nation's history relied primarily on local sources of food, increasingly large school districts, rise of urbanism and growth of complex administrative, regulatory and financial environments have all contributed to a diminished role for the presence of local foods in schools. In recent years a growing awareness, understanding and concern about sustainable economies, nutrition and holistic pedagogy have yielded a greater interest in sourcing locally sourced locally produced foods. Healthier food options, positive educational experiences and investment in local economies are key benefits that have accrued through development of formal and informal farm-to-school programs (Joshi, 2006). The U.S. Department of Agriculture estimates about 40 percent of school districts in the country participate in farm to school activities (Ralston, et.al., 2017).

Middle Tennessee is a region with historically strong levels of local farming. Tennessee as a whole has some 91,000 farms that generate over \$2.2 billion in annual income and employ over 200,000 persons. The largest Metropolitan Statistical Area (MSA) in the state is the Nashville MSA with an approximate population of 1.8 million and approximately 304,000 students enrolled in K-12 education (U.S. Census, 2015). Students attend a variety of schools by type, size and organization with varying involvement with and access to local food. This research examines the farm to school activity in leading private K-12 schools in the greater Nashville area.

The USDA has conducted a national census of schools and school districts since 2013 on farm to school program activity. In the most recent 2015 census, 15 Nashville area schools or districts responded to this census, with only one private school included. This research uses the framework of USDA survey to assess activity and issues for private K-12 schools, mirroring closely the instrument and approach of the larger study.

Objectives:

This goal of this project is to better understand the opportunities and challenges of implementing and maintaining farm to school activities in private schools in the Nashville area. Private schools particularly are of interest insofar as they may experience greater latitude in piloting programs than do large systems and also favor programs that provide unique educational and institutional offerings of interest to students, parents and community partners.

Data and Methods:

A 30-question survey was adapted from the USDA census instrument to assess these topics with school leaders. The survey was directed to 16 of the largest private schools in the Nashville area, addressed to those schools' principal, headmaster, head of school or other individual with key knowledge and responsibility for farm to school program decisions. Out of 16 potential respondents, 10 responded for an overall response rate of 62.5%. Data were subjected to

descriptive statistics and chi-square analysis to determine if attitudes toward benefits and problems differed between all Tennessee schools and school districts that responded to the 2015 USDA census and those private schools responding to survey response in this research.

Results:

The majority of survey respondents hold positive attitudes regarding increased lunch participation by students as a result of farm to school programs as well as favorable attitudes regarding reduced waste of food. This differed from the overall state response that found benefit in greater community support and in reduced cost of food. The most recent Farm to School Census responses from Tennessee were heavily weighted toward public school systems (90%) while the survey sample was drawn entirely from private schools, suggesting notable differences in reasons for participation. Likewise, distinctions in problems with the farm to school programs were distinctively different between predominantly public versus private schools. For both groups, finding local produce year-round was viewed as the biggest barrier to the program. However, among public school systems, finding local growers and coordinating procurement was named as a much more important barrier than among private schools. Private schools named as somewhat higher the issue of compliance with purchasing regulations and as a very important barrier the challenge of year-round availability of local food. Among public schools, high or unstable cost of local food was viewed as only a moderate problem but as less of a food cost reduction by those active in farm to school programs than those who anticipated starting them. In this regard, attitudes about benefits seemed to correspond with perceived difficulties with the programs. Since farm to school activity is available to all types of schools, utilizing these findings and insights offers opportunity particularly for private schools that may have greater agility in initiating farm to school program activity.

References

Evans, A., Ranjit, N., Rutledge, R., Medina, J., Jennings, R. and Smiley, A. 2012. Exposure to multiple components of a garden-based intervention for middle school students increases fruit and vegetable consumption. *Health Promotion Practice* 13(5):608–16.

Joshi, A. 2006. Year one evaluation report: fresh from the farm program implementation at Lozano Bilingual and International Center School. Chicago IL, USA.

McAleese, J.D., Rankin, L.L. 2007. Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. *Journal of the American Dietetic Association* 107(4): 662-665.

Morris, J.L. 2002. Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *Journal of the American Dietetic Association* 102(1):91-93.

Katherine Ralston, Elizabeth Beaulieu, Jeffrey Hyman, Matthew Benson, Michael Smith. Daily Access to Local Foods for School Meals: Key Drivers, EIB-168, U.S. Department of Agriculture, Economic Research Service, March 2017.

U.S. Bureau of Census, American Community Survey. 2015. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_S1401&prodType=table
Accessed March 27,2017.

Food Claims For Certified Organic Food: A Canadian Field Study

Stéphane Legendre, Deny Bélisle & Soumaya Cheikhrouhou

Abstract

Purpose of the Research

This paper aims at exploring the diversity of the claims displayed on certified organic food packaging. Specifically, the objective of this article is to identify food claims types used per category and to analyze both intratype and intertype combinations of claims displayed on product packagings.

Background/Motivation/Support

According to MarketLine (2017a), the Canadian market for organic food is expected to reach 4.9 billion US dollars in 2021, a striking growth of 37.4% since 2016. This increase is expected to be even steeper in the European market which growth rate would peak at 43% in the same period for a total of 52.6 billion US dollars (MarketLine 2017b). This increasing popularity among consumers has been explained by research, which demonstrated that organic food certification has a positive effect on perceived benefits (e.g., health, hedonic, safety, environmental responsibility), purchase intention, and willingness to pay (Bauer, Heinrich, & Schäfer, 2013). To consolidate their organic positioning and communicate product characteristics that differentiate them from both organic and non-organic competitors, producers and manufacturers of certified organic food often choose to adopt and display different information on their packaging such as claims and certifications (Zepeda, Sirieix, Pizarro, Coderre, & Rodier 2013). While most studies and reports on organic food market have mainly focused on describing the categories growth, consumer purchase habits, and competition (Bezawada & Pauwels, 2013), little is known about the actual use of claims displayed on products packagings.

Methodology

In this study, 209 packagings of certified organic foods were analyzed according to the Canadian Food Inspection Agency (CFIA) typology of food claims, which is the reference for all inspectors and stakeholders in Canada. The CFIA typology distinguishes six categories of food claims: 1) *Origin Claims* to declare the country of origin or the local origin of the product, 2) *Composition and Quality Claims* to present the content of a product or its specific characteristics, 3) to describe how a product was produced, grown, handled or manufactured, 4) *Allergen-Free Claims* to inform consumers about the presence of allergens or gluten, 5) *Nutrient Content Claims* to describe the nutrients or energy value of a food and 6) *Health Claims* to imply that a relationship exists between the consumption of a food and individual's health. The selection of the major food retailer from which the data was collected for this field study was based on three criteria, namely the importance of food turnover, the size of organic food assortment offered by this retailer, and the availability of an online grocery store with high definition packaging images. Once the retailer has been identified, two-step program was used to collect the data. First, a search for certified organic products was conducted throughout the retailer's online

grocery store. High- definition images of each of the product packaging were copied and numbered into a first database. A total of 222 certified organic products have been identified in this process. For purposes of external validity, only national brand products were selected, which corresponds to 209 products (see Table 1). Subsequently, claims presented on each product packaging were coded into a second database according to the CFIA typology. On average, 2.27 claims were displayed on each of the 209 packagings studied, with the category of deli and cheese having the highest number of claims on average (5.75), followed by commercial bakery (3.20), meat (2.75), and frozen products (2.68). Certified organic foods were mostly found in the category fruits and vegetables (n = 42), refrigerated grocery (n = 42), and frozen products (n = 31).

**Table 1: Certified organic food packagings by product category
(n = 209 packagings)**

Product category	Number of packaging per product category		Average number of claims per packaging	
	Frequency	Percentage	Mean	SD
Beverages	4	1.9	1.25	0.957
Bakery	3	1.4	1.67	0.577
Commercial bakery	5	2.4	3.20	2.168
Deli and cheese	4	1.9	5.75	2.062
Fruits and vegetables	42	20.1	1.79	1.586
Seafood	3	1.4	0	0.000
Bulk foods	11	5.3	2.27	1.618
Refrigerated grocery	42	20.1	2.45	1.596
Other produce	1	0.5	12	0.000
Frozen	31	14.8	2.68	1.833
Ready to eat	2	1.0	1	0.000
Baby food	12	5.7	2.50	1.087
Meat	4	1.9	2.75	1.500
Grocery	45	21.5	1.89	1.748
Total	209	100	2.27	1.860

Findings

Table 2 presents the frequency of claims observed on the packaging of certified organic foods for each type of claim. The three most common types of claims were those associated with the composition and quality of the product (69.9%), the nutrient content (55.0%), and the methods of production (39.7%). In addition, the most frequent claims observed were good taste (22%), gluten-free (19.1%), country of origin (14.4%), Non-GMO (12.9%), kosher (11.5%), and percentage of fat content (11.5%).

Table 2: Frequency of claims on certified organic food packagings according to the CFIA typology (n = 209 packagings)

Origin Claims			Allergen-Free Claims		
	Frequency	%		Frequency	%
Country of origin	30	14.4	Gluten-free	40	19.1
Quebec foods	6	2.9	Peanut-free	5	2.4
Foods prepared in Quebec	4	1.9	Soy-free	2	2.4
Quebec organic foods	4	1.9	Nut-free	3	1.4
Product of Quebec	3	1.4	No wheat	2	1.0
			Yeast-free	1	0.5
			Sulphite-free	1	0.5
Total	47	22.5	Total	54	25.8
Composition and Quality Claims			Nutrient Content Claims		
	Frequency	%		Frequency	%
Good taste	46	22.0	% of fat content	24	11.5
No preservatives	14	6.7	No sugar added	18	8.6
Lactose free	11	5.3	Vitamins added	14	6.7
Dairy free	11	5.3	Source of fibre	9	4.3
Vegan	11	5.3	% moisture	9	4.3
Fresh	8	3.8	Cholesterol free	7	3.3
Canada A	5	2.4	Source of omega-3, omega-6	6	2.9
Nitrite-free	5	2.4	Source of calcium	5	2.4
With quinoa	4	1.9	Trans fat free	6	2.9
Canada N° 1	4	1.9	Protein	5	2.4
Whole grains	4	1.9	High in iron	5	2.4
Unpasteurized	4	1.9	No added salt	4	1.9
Casein free	4	1.9	Source of potassium	2	1.0
With chia	2	1.0	Source of energy	1	0.5
No caffeine	2	1.0			
Egg free	2	1.0			
Vegetarian	2	1.0			
Kale	2	1.0			
Not from concentrate	1	0.5			
100% pure	1	0.5			
With acerola	1	0.5			
No MSG	1	0.5			
No animal rennet	1	0.5			
Total	146	69.9	Total	115	55.0

Method of Production Claims			Health Claims		
	Frequency	%		Frequency	%
Non GMO	27	12.9	Probiotic	7	3.3
Kosher	24	11.5	Enzyme rich	3	1.4
Natural	13	6.2	Contains antioxidants	2	1.0
Artisanal	5	2.4	Contains bacteria	2	1.0
Animal welfare	3	1.4			
Without antibiotics	3	1.4			
Grown in greenhouse	2	1.0			
Cold-pressed	2	1			
No artificial flavours	2	1			
Cage free	1	0.5			
Family farms	1	0.5			
Total	83	39.7	Total	14	6.7

Table 3 shows the frequency of intratype claims combinations (e.g., the combination of two method of production claims on the same packaging) and intertype claims combinations (e.g. the combination of one origin claim and one method of production claim on the same packaging) on the analyzed packagings of certified organic foods. Thus, the two most common intratype combinations are the nutrient content claims (17.2% of the packagings analyzed) and the composition and quality claims (12.9%). The most common intertype combinations of claims identified is those of the composition and quality claims and the method of production claims (20.6%) as well as those of the composition and quality claims and the nutrient content (19.1%).

Table 3: Frequency of intratype* and intertype claims combinations on packagings of certified organic foods (n = 209 packagings)

	Origin	Allergen-Free	Composition and Quality	Nutrient Content	Method of Production	Health
Origin Claims	3 (1.4)**					
Allergen-Free	5 (2.5)	11 (5.3)				
Composition and Quality	20 (9.6)	31 (14.8)	27 (12.9)			
Nutrient Content	10 (4.8)	23 (10.0)	40 (19.1)	36 (17.2)		
Method of Production	16 (7.7)	21 (10.0)	43 (20.6)	28 (13.4)	14 (6.7)	
Health	0 (0)	3 (1.4)	6 (2.9)	3 (1.4)	7 (3.3)	4 (1.9)

* the diagonal presents the frequency of intratype combinations

** the number in parentheses represents the percentage of packagings.

Contributions to Theory and Practice

This field study aimed at analysing the diversity and frequency of food claims usage on the packaging of certified organic food. This research presents relevant theoretical and managerial implications. From a theoretical perspective, it constitutes a first application of the CFIA typology of food claims, which is an interesting claims categorization to be studied further in future research from the consumers point of view. Despite the wide variety of claims used in the industry, little research has been undertaken to categorize them and to propose a typology relevant for both researchers and managers. From a managerial standpoint, this research allows for a better understanding of the industry practices in terms of types and number of claims presented on product packaging in addition to the already presented organic food certification. Among claims categories, it appears that claims regarding country of origin, good taste, kosher certification, non-GMO production process, no gluten, and fat content are most often presented on certified organic food packagings. Identifying these claims will allow for the investigation of the extent to which adding them would contribute significantly to the perceived benefits of certified organic food for consumers. Besides, it should be noted that some claims identified in our field study (such as non GMO, natural, animal welfare, no antibiotics, cage free, pesticide residue free) are already included in the Canadian organic certification requirements (Standards Council of Canada 2018). However, it is unclear whether the certification-claim combination is efficient and in which context it would be. This issue requires further investigation. This study has some limitations that should be noted and overcome in future research. First, it analyzed the certified organic food assortment of one important retailer, which might hinder the generalizability of the results as a reflection of the Canadian food industry practices. Moreover, despite the relevance and the efficiency associated with the analysis of high-definition pictures of packagings, it is possible that some claims presented on the other sides of packagings has been missed and should be included in future studies.

Selected References

- Bauer, H.H., Heinrich, D., & Schäfer, D.B. (2013). The effects of organic labels on global, local, and private brands: More hype than substance? *Journal of Business Research*, 66(8), 1035-1043.
- Bezawada, R., & Pauwels, K. (2013). What is special about marketing organic products? How organic assortment, price, and promotions drive retailer performance, *Journal of Marketing*, 77(1), 31-51.
- Canadian Food Inspection Agency (2018). <http://www.inspection.gc.ca/>
- MarketLine (2017a). Canada – Organic Food. Industry profile.
- MarketLine (2017b). Europe – Organic Food. Industry profile.
- Standards Council of Canada (2018). Organic production systems: general principles and management standards <http://www.publications.gc.ca/>
- Zepeda, L., Sirieix, L., Pizarro, A., Coderre, F., & Rodier, F. (2013). A conceptual framework for analyzing consumers' food label preferences: An exploratory study of sustainability labels in France, Quebec, Spain and the US, *International Journal of Consumer Studies*, 37(6), 605-616.

The Effect Of Labelling Genetically Modified Products On Consumer Purchasing Behaviour

Andrew Baynham & Mike Von Massow

Abstract

We explore how consumer decision making changes when labels which say “may contain genetically modified ingredients” (GM) or “may contain genetically engineered ingredients” (GE) appear on products. Specifically, we evaluate the degree to which the addition of GM or GE labels affects purchasing decisions.

The average Canadian consumer, while holding negative opinions about GM foods, admits they do not fully understand the terms GM, GE, and biotechnology (Canadian Food Inspection Agency (CFIA) 2015). This can allow media campaigns with strong emotional appeals to influence the opinion of the average Canadian consumer. One of the assumptions of mandatory labelling is that by adding labels and increasing the information on products, those who want to avoid GM food will do so. Given that assumption we seek to determine if people observe the information on a label and if it changes their purchasing behaviour.

Globally, there are 64 countries world wide require mandatory labelling of GM products (Bellingham 2014). In the US, labeling was previously regarded as a state issue. In 2016 Vermont passed a law requiring mandatory on package labelling of GM foods. This bill was quickly superseded at the federal level through bill s.764, otherwise known as the dark act (Fraboni 2017). The Federal Act is regarded as a method to hide the labelling standard required by Vermont by allowing for alternative labelling techniques such as QR codes (Fraboni 2017).

A study done in the US by Kaye-Blake et al. (2004) showed that while between 81% - 93% of the population was opposed to GM products, where as 43% would not purchase GE products. In 2016, the Government of Canada conducted a survey focusing on the attitudes of Canadians towards GM foods. They found that the majority of Canadians wanted stricter labelling on food packaging but only 11% said it would influence their purchasing decisions (Government of Canada 2016)

In Canada the Federal Government currently employs voluntary labelling laws for GM and GE products. This is based on three basic tenants as outlined by Health Canada and the Canadian Food Inspection Agency (CFIA) (2015): Mandatory labeling is only required for food posing a health risk, Voluntary positive labeling (“does contain”) under conditions to not mislead the public, Voluntary negative labeling (“does not contain”) under conditions to not mislead the public.

The labeling of GM foods is controlled by Health Canada and the CFIA. Health Canada is tasked with creating the regulation and CFIA the enforcement around the labelling of GM food. GM foods fall under the umbrella term of novel food being a relatively new technology in producing food. Novel foods in Canada, including GM foods, do not require labels. Canada’s labelling system tends to favour labelling strategies such as Non-GMO project or Organic labels. Novel foods do not have to be labelled unless there are associated health effects. The label would

not detail the use of novel food, but a change in health information. For example, if there is added sugar, the product would have to display the change in health information, but not that it is a novel food.

Heslop (2006) outlines two assumptions used by those advocating for labelling: individuals will notice and be influenced by the label, and individuals have a broad range of products to choose their optimal choice given the new information. However, if the additional label has no effect, the label could add to the saturation of information on products (Heslop 2006). These assumptions are present in the majority of studies exploring GM labelling as they focus on the consumer processing information for a purchasing decision.

This study uses a discrete choice experiment to illicit preference about products with GM, GE and Non-GMO attributes. The University of Guelph has a retail grocery laboratory where real world market scenarios can be simulated. We use TOBII Pro II eye tracking glasses to determine if and how long an individual observes the GM, GE or non-GMO label.

Each participant was given a grocery list and asked to shop for 19-20 items. Participants were then required to complete an exit survey detailing their knowledge and beliefs of GM foods, their general shopping habits and demographic information. The product selected for this study was granola bars. There were four categories of granola bars. The four categories of bar were perceived unhealthy (1), perceived healthier (2), functional bars (3) and non-GMO/organic bars (4). Granola bars are a commonly purchased item in Canada, consumers are familiar with the product and the GM content is more apparent. Participants were also able to not choose a bar which created a fifth category. The granola bars were analyzed under 3 different scenarios: one control group (No label), may contain GM ingredients label, and may contain GE ingredients label.

Participants were recruited from the University of Guelph campus, with a focus on millennials. We therefore limited participation to those between the ages of 18-30. While this is a convenience sample it is also relevant as the importance of millennials in the market is only growing. According to Oz et al. (2017), millennials in the US have passed the previous generation in terms of number of total number of individuals and in the labour force in the US. This emerging demographic will help shape how GM foods are perceived in the market and future labelling policy.

The analysis was done using a multinomial logit mode. There were five categories participants could choose from: perceived unhealthy (1), perceived healthier (2), functional bars (3), non-GMO/organic bars (4) and a category for participants who did not choose a granola bar (5). The base category selected was the functional bar category 3.

The effect of the GM and GE labels were unexpected and inconsistent, but there was evidence to support positive labelling. Table 1 provides a selection of the marginal effects at the means for the estimated coefficients.

Table 1: Selection of Marginal

choice	(1)	(2)	(3)	(4)	(5)
GE time	-0.0427	-0.233	0.117*	0.161	-0.00209
	(-0.91)	(-1.73)	(1.96)	(1.19)	(-0.03)
GM time	0.193	0.643	0.439	-1.451	0.177
	(1.19)	(1.17)	(1.56)	(-1.65)	(0.91)
Organic time	-0.129	-0.997**	0.244	0.790**	0.0915
	(-0.99)	(-2.64)	(1.88)	(2.60)	(0.85)
Non-GMO time	-0.0564	-0.00383	-0.114	0.238**	-0.0637
	(-1.13)	(-0.05)	(-1.64)	(2.61)	(-1.13)
GM label	0.174*	0.518**	-0.152*	-	-
	(2.05)	(3.38)	(-2.30)	-	-
GE label	0.223*	0.562**	-0.173*	-	-

	(2.14)	(3.17)	(-2.3 0)	-	-
--	--------	------------	-------------	---	---

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results for time spent looking at organic and non-GMO labels followed previous literature showing an increase in the probability of choosing an organic or non-GMO product (category 4) the longer the individual observed the label. With the exception of the functional bar (category 3), the presence of a GM and GE label did not have the expected effect of being negative and significant. For category 1 and 2 there was a positive and significant effect. One possible explanation could be that the participants were using the new label as a justification for making their purchase. The Non-Gmo or organic bars have a label and reading it makes a difference on choice. Those consumers who are less concerned (have historically bought bars in category 2 or 3) may infer an endorsement from a visual cue and rationalize the “less healthy” decision without taking the time to process what the label says. The presence of the label caught the participants eye and was used to confirm their purchase. The lack of significance on GM or GE time implies that reading or comprehending the label did not influence an individual’s decision. This implies that although the label was effective in influencing purchasing decisions the individual likely did not know what information the label provided. We cannot state definitively that a GM or GE label increases the likelihood of a product being purchased, as the variable may be capturing other effects. This may merit further investigation. The functional bar did have a negative and significant marginal effect which is significant given its shelf proximity to the non-GMO products. The functional bars were situated beside the non-GMO bars on the store shelf. Given the ease of direct comparison between the functional and non-GMO bars one might expect a stronger label effect. In addition, consumers of functional bars are looking for added traits such as high in fibre or protein and may be predisposed to looking for labels and selecting based on broader criteria. The section of consumers purchasing functional bars could also be more likely to care about GM or GE attributes. The preliminary findings of this research support the effectiveness of current non-GMO and organic labelling. The results for labels which say “may contain genetically modified ingredients” or “may contain genetically engineered ingredients” do not definitively suggest that mandatory labelling will decrease the likelihood of a GM food being purchased.

References

- Bellingham, J. 2014. “Labeling for Better or Worse: As US Legislation and Voters Continue to Wrestle With GM Labeling, What is at Stake?” *Nature Biotechnology* 32 (12):1180–1183.
- Canadian Food Inspection Agency (CFIA). 2015. “Labelling of Genetically Engineered Foods in Canada.” Accessed March 27, 2017. Retrieved from URL: <http://www.inspection.gc.ca/food/labelling/food-labelling-for-industry/method-of-production-claims/geneticallyengineered-foods/eng/1333373177199/1333373638071>
- Fraboni, J. 2017. “A Federal GMO Labeling Law: How It Creates Uniformity and Protects Consumers.” *Berkeley Technology Law Journal* 1.

- Government of Canada, Health Canada. 2016. "Report on Consumer Views of Genetically Modified Foods." Accessed July 25, 2017. Retrieved from: <http://epe.lac-bac.gc.ca/100/200/301/pwgsctpsgc/por-ef/health/2016/042-15-e/report.pdf>.
- Heslop, L. 2006. "If we Label it, Will They Care? The Effect of GM-ingredient labelling on Consumer Responses." *Journal of Consumer Policy* 29(1):203–228.
- Kaye-Blake, W., K. Bicknell, and C. Lamb. 2004. "Willingness to pay for GM food labelling in New Zealand." *CAB International. Consumer Acceptance of Genetically Modified Food*: 73– 82.

The Impact of Local Labelling on Established Brands and New Entrants in the Condiment Category

Michael Von Massow & Jennifer Leslie

Abstract

Purpose of the Research

The purpose of this study is to evaluate the degree to which local labelling can enhance a brand or provide leverage for a new entrant to build share relative to an established brand.

Background/Motivation/Support

Origin is thought to be an increasingly important characteristic in shaping consumer demand for food products. This can sometimes be at odds with established brands and global supply chains. Governments are particularly interested in fostering economic activity and encourage the consumption of “local” food products to generate sales for domestic producers.

In Canada, the Ontario provincial government invested over 180 million Canadian dollars in initiatives to promote local food between 2003 and 2018 (OMAFRA, 2018). The Ontario provincial government defines local food as *...food produced or harvested in Ontario, including forest or freshwater food...* (Legislative Assembly of Ontario, 2013). In 2013, the H.J. Heinz Company announced it was closing its ketchup processing facility in Leamington, Ontario, that had been operational for over a century (Atkins, 2013). Heinz’s processing facility in Leamington accounted for 40% (200,000-tonnes) of the Ontario’s annual tomato crop (Atkins, 2013a). French’s, a UK company, in response to the social media and public media response to the Heinz closure and outsourcing launched a ketchup product to Canadian grocery stores in 2014. The new French’s ketchup product was made in Ontario, using the Ontario tomatoes, those previously used for producing Heinz’s ketchup. French’s marketed the ketchup’s product attributes, using social media and traditional advertisements.

In spring 2016, one of Canada’s largest grocery retailers, the Loblaw Companies Limited, announced that it was removing French’s regular flavoured ketchup from its shelves due to low sales. Given the recent social media and popular media engagement with the French’s brand, the announcement by Loblaw’s was met with public opposition. Canadian consumers took to social media to complain, and within 24 hours of the initial announcement, Loblaw’s announced it was reversing its decision and stocking the French’s ketchup product (Goodyear, 2016). At the end of 2016, French’s company reported a market share of ketchup sales in Ontario increased by 15%, accounting for 18% of the market (Hill, 2016). Previous research has focused on the impact a local label has on consumer behaviour (Fiala *et al.*, 2016; Hu *et al.*, 2012). Factors motivating the demand for local food include: consumer’s interest in healthy lifestyles, interest in methods of food production; perceived food quality attributes, environmental concerns (Fiala *et al.*, 2016). Menapace & Raffaelli (2017) found that participants being observed while making a purchasing choice resulted in a shift towards more sustainable decisions.

Heinz is the dominant ketchup brand in the Canadian market. French's, on the other hand, is the dominant prepared mustard brand in the market. Heinz has launched a prepared mustard to compete with French's in that segment. The situation in Ontario provides an opportunity to examine the effects of local labelling on consumer choice for dominant brands versus new entries. The purpose of this study is to evaluate the degree to which local labelling can enhance a brand or provide leverage for a new entrant to build share relative to an established brand.

Methodology

The experiment and recruitment were conducted on the University of Guelph campus, over the 2017/2018 academic year. The experiment took place in the Longo's Food Retail Laboratory, a 1,400 square foot research grocery store. Participants were fitted with the TOBII eye tracking glasses and given a 20 item shopping list, which included ketchup and mustard. Three labelling scenarios were run: control, no local labeling; French's ketchup and mustard labelled as local; and Heinz's ketchup and mustard labelled as local.

After completing the experiment, participants completed a survey that included demographic questions, the Health and Nutritional Awareness Questionnaire (HNAQ) and the Food Choice Questionnaire (FCQ) to capture the complex factors that influence health consciousness and consumers' food choices. In total, 164 respondents participated in the experiment, 57 in the control group, 53 in the French's labelling scenario and 61 in the Heinz's labelling scenario.

To assess visual focus and attention, areas of interest (AOI) were created around the product information, the product title, price and local label, if present in the scenario. TOBII Lab Pro and the TOBII eye tracking glasses record five variable types for each AOI:

1. Time to first fixation – time from the product being observed to the first fixation on an AOI
2. Fixation count – number of fixations on an AOI
3. Total fixation duration – sum of time fixated on an AOI
4. Visit count – number of distinct visits to an AOI
5. Total visit duration – sum of time of all visits to an AOI

Two separate logistic regressions were run, one for the ketchup choice, and the other for the mustard choice.

Findings

Initial results are presented in Table 1. In three of the four cases, the presence of a local label did not make a significant difference on the probability of selection for a product. In the case of French's ketchup, the local label had a significant negative effect, reducing the probability of selecting. This result is counter intuitive. If we consider fixation on the local label, all four fixation variables are not significant. In this case, the fixation on the Heinz mustard local label was almost significant ($p=0.053$) and the longer the consumer looked at the local label on Heinz, the less likely they were to buy French's mustard.

One might surmise that the significant media attention to the ketchup issue created a positive halo for French's. The local label may put a definitive characteristic to French's ketchup which has less value than the general positive feelings generated by the considerable buzz. It is worth noting that the French's ketchup was priced at a premium to Heinz (as is the norm in stores). The premium, when assigned specifically to local, may have been too high. This result could also be spurious given the relatively small share of French's overall and merits further investigation. What is relatively clear is that Heinz is the dominant brand with a well-established position and information relative to local as presented did not sway those consumers who have not already decided to switch. The proportion of people who fixated on the label at all was small (approximately 20%) but even those did look at the label were not significantly impacted by the information.

The results in mustard were somewhat different. In both cases the local label made no difference across the whole sample. The fixation time on the local label for Heinz mustard was almost significant ($p=0.053$) and increased the likelihood that Heinz mustard was chosen. This suggests that there may be an issue with seeing and processing the label – less than a third of consumers fixated on the label at all. When consumers fixated on the local label on Heinz mustard it tended to increase their likelihood to buy it. Alternately, the brand choices are so ingrained that even if the local label was bigger and more visible, consumers have made the choice before they get to the shelf and more information at the time of purchase is not going to make a difference.

It is worth noting that fixation on the local label was more likely for mustard than for ketchup (approximately 50% higher). This may be an indication that the brand loyalty is less firmly established in mustard and that consumers are more open to considering additional information to make the decision. The local label on French's mustard, even when fixation occurred, did not make it more likely to be chosen while fixation on Heinz mustard tended to make the choice more likely. This may suggest that Heinz is a stronger brand in condiments than French's. Another potential explanation for the higher likelihood of fixation is that the local label is a large share of the front of package space. Labels were the same size in both instances but ketchup bottles are bigger.

Price fixation was only significant for French's mustard which was cheaper than Heinz mustard. The impact of price on the probability of purchase, while significant, was small. In ketchup, Heinz was the cheaper product and fixation on the Heinz ketchup price tended ($p=0.056$) to increase the likelihood of choice of Heinz. Once again the size of the effect was relatively small. This further suggests that brand choices are well established before condiment consumers get to the shelf and that a relatively small proportion is driven by price differences.

Table 1: A selection of initial results for the marginal effects at means for logistic regressions where the dependent variable is a participants product choice: 0 is a Heinz product, and 1 is a French's product

Variable	Marginal Effects at Means	
	Ketchup	Mustard
Labelling Scenario		
French's products labelled as local	-0.077 (0.036)	-0.005 (0.466)
Heinz's products labelled as local	0.020 (0.850)	-0.010 (0.297)
Eye tracking variables		
Total fixation on French's ketchup title	0.020 (0.129)	-
Total fixation on French's ketchup local label	0.053 (0.511)	-
Total fixation on French's ketchup price	0.040 (0.229)	-
Total fixation on Heinz ketchup title	0.063(0.056)	-
Total fixation on Heinz ketchup local label	0.435(0.482)	-
Total fixation on Heinz ketchup price	0.060(0.055)	-
Total fixation on French's mustard title	-	-0.003 (0.442)
Total fixation on French's mustard local label	-	-0.016 (0.424)
Total fixation on French's mustard price	-	0.031 (0.044)
Total fixation on Heinz mustard title	-	-0.002 (0.615)
Total fixation on Heinz mustard local label	-	-0.121 (0.053)

Total fixation on Heinz mustard price	-	-0.002 (0.822)
---------------------------------------	---	----------------

(numbers in brackets
are p values)

Selected References

Atkins, E. (2013). Heinz to close Ontario factory, trim 740 jobs. *The Globe and Mail, Food and Beverage*. Retrieved on April 20th, 2018 from: <https://www.theglobeandmail.com/report-on-business/heinz-to-close-ontario-plant-cut-800-jobs/article15442338/>

Atkins, E. (2013a). Leamington's Heinz farmers: 'There is life after tomatoes'. *The Globe and Mail, Food and Beverage*. Retrieved on April 20th, 2018 from: <https://www.theglobeandmail.com/report-on-business/leamingtons-heinz-farmers-there-is-life-after-tomatoes/article15532461/>

Fiala, J., I. Toufarova, S. Mokry & M. Soucek. (2016). Perception of local food labelling by generation Z: An eye tracking experiment. *European Journal of Business Science and Technology*. Vol 2(2): 152 – 159.

Goodyear, S. Loblaw's French's ketchup snub sparks patriotic backlash. *Canadian Broadcasting Corporation*. Retrieved on April 16th, 2018 from <http://www.cbc.ca/news/business/frenchs-ketchup-canadiana-1.3491952>

Hill, S. (2016). Heniz. French's. Primo. Who won the ketchup war? *Windsor Star*. Retrieved on April 15th, 2018 from: <http://windsorstar.com/news/local-news/heinz-frenchs-primo-who-won-the-ketchup-war>

Hu, W., M.T. Batte, T. Woods & S. Ernst. (2012). Consumer preference for local production and other value-added label claims for a processed food product. *European Review of Agricultural Economics*. Vol 39(3): 489-510.

Legislative Assembly of Ontario. (2013). Bill 36, Local Food Act, 2014. Retrieved on April 15th, 2018 from: http://www.ontla.on.ca/web/bills/bills_detail.do?locale=en&Intranet=&BillID=2754

Menapace, L. & R. Raffaelli. (2017) Preferences for locally grown products: evidence from a natural field experiment. *European Review of Agricultural Economics*. Vol 44(2): 255-284.

OMAFRA. (2018). Ontario's local food strategy. *Queens Printer for Ontario*. Retrieved on April 15th, 2018 from: <http://www.omafra.gov.on.ca/english/about/localfood.htm>

Drivers and Barriers of Seaweed Consumption in Australia

Dawn Birch, Kåre Skallerud & Nicholas Paul

Abstract

Commonly consumed in Asia and some coastal regions, seaweed is not part of the traditional diet of most western societies (Brownlee et al. 2012; Chapman et al. 2015; Prager, 2017). Yet, seaweed as a food is experiencing a rise in popularity in Western societies, being featured on restaurant menus, television cooking shows and being the focus of dedicated cooking books (Mouritsen 2013; Tinellis, 2014). In particular, seaweed consumption associated with sushi and as an ingredient in snack foods such as seaweed flavoured crackers has experienced growth in recent times (Altintzoglou, et al. 2016). Seaweed is rapidly gaining attention as being a very healthy and nutritious addition to the western diet. Indeed, renowned UK chef Jamie Oliver recently stated that seaweed is “the most nutritious vegetable in the world”. Seaweed delivers numerous health benefits and is a highly nutritious functional food, rich in antioxidants and beneficial micronutrients (Bouga and Combet 2015; Gupta & Abu- Ghannam, 2011; Roohinejad et al. 2016). In addition, seaweed is high in dietary fibre and has been found to aid weight loss (Brownlee et al. 2012; Hall et al. 2012). Moreover, seaweed is a more viable, sustainable, ethical, plant-based source of high quality and low fat protein than red meat (Ariole et al. 2015; de Boer et al. 2012; Duarte et al. 2017; Fleurence et al. 2012; Verbeke, 2015).

Novel or unfamiliar foods are typically associated with greater scepticism and reduced sensory liking as well as being perceived to be less readily available and more expensive (Arvola et al. 1999; Raudenbush & Frank, 1999). Papista & Kyrstallis, 2013; Perrea et al. 2017; Verbeke, et al., 2009). Neophobia or the unwillingness to try new or unfamiliar foods results in high failure rates for innovative and novel food products (Barrena & Sanchez 2012; Pliner & Hobden 1992; Tuorila et al., 1994). Aversion, danger and disgust are the three main reasons for neophobia or food rejection (Rozin, et al., 1993). In addition to avoiding unfamiliar foods and concerns about physical risks, consuming unfamiliar products such as seaweed may lead to repulsion or what has been termed the ‘yuck factor’ (Pluhar 2010; Verbeke et al. 2015). Hence, despite evident health and environmental benefits, getting consumers in Western societies to replace traditional meats with alternative and unfamiliar sources of protein such as seaweed will be challenging (Chapman et al. 2015; Prager, 2017; Schösler, de Boer, & Boersema, 2012).

Based on the limited literature around seaweed consumption, we propose that Australian consumers’ intentions to consume seaweed and consumption frequency will be associated with key drivers and barriers of seaweed. However, the relationship will be mediated by psychological influences over seaweed consumption including neophobia, responsibility with food and concerns about food safety, health-consciousness, symbolic value and snacking behaviours. To test our proposed framework, a national online survey of 521 Australian consumers comprised of 60.5% females. The largest age group was 18-34 years (34.4%), followed by 45-59 years (26.3%), 60 years and over (19.8%), and then 35-44 years (19.5%). The largest educational

category was trade and technical level (32.8%), followed by secondary school (30.1%), undergraduate degree (24.2%) and post-graduate degree (12.5%). About half of the sample (52%) had a household annual income above AUD60,000, with the largest income category (31.9%) being less than AUD40,000.

Results revealed that about three quarters of the respondents indicated that they had tasted or eaten seaweed in the past; however, fewer (37%) and females more so than males ($X^2 = 4.52$ ($p = .03$)) had consumed seaweed more than once per month in the past 12 months. However, 62% indicated they would be likely to eat seaweed in the next 12 months. Those who had eaten or tasted seaweed in the past, were more likely to eat seaweed in the next 12 months (77%) than those who had not tasted seaweed in the past (8%) ($X^2 = 149.84$, $p = .000$). More highly educated people were more likely to have eaten or tasted seaweed ($X^2 = 9.84$, $p = .02$), had consumed seaweed more frequently in the past 12 months ($X^2 = 25.57$, $p = .00$), and were more likely to consume seaweed in the next 12 months ($X^2 = 21.90$, $p = .00$). People with higher household incomes were more likely to have eaten or tasted seaweed ($X^2 = 19.07$, $p = .00$), had consumed seaweed more frequently in the past 12 months ($X^2 = 17.01$, $p = .00$), and were more likely to consume seaweed in the next 12 months ($X^2 = 9.24$, $p = .03$). Younger people were more likely to have eaten or tasted seaweed ($X^2 = 12.09$, $p = .01$) and to have consumed seaweed more frequently in the past 12 months ($X^2 = 20.62$, $p = .00$). However, they were no more likely to consume seaweed in the next 12 months than older consumers.

The most relevant reasons for eating seaweed are linked to functional benefits including being healthy (64.1%), nutritious (60.8%), a natural source of Omega 3 (58.5%), and natural. Hedonic reasons such as being tasty (59.9%), liking seaweed (59.1%) and considering seaweed to be pleasant (53.4%) are also relevant reasons for eating seaweed. Other relevant functional reasons include seaweed being safe to eat (57.2%), fresh (57.4%), a good source of protein (53.6%), low in calories (52.4%), a good source of iodine (51.8%), diet variety (51.1%), and versatility (50.5%). More than half of the respondents noted that being sustainable (52.8%) and environmentally friendly (53.4%) were also relevant reasons for eating seaweed. Respondents likely to eat seaweed in the next 12 months, scored significantly higher ($p = .00$) on all the relevant reasons for eating seaweed as compared with the respondents who were unlikely to eat seaweed in the next 12 months.

Reasons for not eating seaweed concern functional risk associated with lack of knowledge of the product category including how to prepare it (44.5%), not having recipes (40.7%), how long it can be kept (40.5%), what to serve it with (37.6%), how to store it (37.6%) or where to buy seaweed (35.5%). More than one-third of the respondents (37%) considered seaweed may be expensive. In terms of sensory characteristics, 38.6% indicated that smell would be a relevant reason for not eating seaweed, while dislike of the taste (37%), not liking seaweed (34.4%), dislike of the texture (33.2%), being unpleasant (33.0%), disliking the appearance of seaweed (29.2%), or that it is “weird” (25.1%) are relevant reasons for not eating seaweed. About one-third of the respondents indicated concern about chemical (36.5%) or bacterial (36.3%) contamination or whether it would be safe to eat (31.5%) as reasons for not consuming

seaweed. About one-quarter of respondents reported concern that seaweed not being good for their health (25.3%) or being allergic to it (23.0%) as a reason for not eating seaweed. Respondents likely to eat seaweed, scored significantly lower ($p < .05$) on all reasons, except for not knowing where to buy seaweed and that seaweed is expensive, indicating that seaweed is generally perceived to be unavailable and potentially expensive.

Exploratory factor analysis revealed five psychological factors explaining variance in seaweed consumption: (1) Food neophobia measured on 5 items, with three selected from Pliner and Hobden's (1992) Food Neophobia Scale (FNS) and two items from the original Food-related Lifestyle (FRL) instrument (Brunso & Grunert 1995); (2) Health consciousness measured on 4 items from Gould's (1990) health-consciousness scale; (3) Responsibility with food and food safety concern items measured on five items from the Modular Food Related Lifestyle (MFRL) Instrument (Birch, Brunso, Grunert & Memery 2017); (4) Symbolic value measured on three items from Laurent & Kapferer's (1985) and Jain and Srinivasan's (1990) consumer involvement profile scales; and (5) Snacking behaviour measured on items in the original FRL instrument (Brunso & Grunert 1995) (Appendix 1). People with higher levels of neophobia were less likely to have eaten seaweed in the past, had consumed seaweed less frequently in the past 12 months and were less likely to consume seaweed in the next 12 months (Table 1). People who are more mindful of their food consumption (reflected by the factor - responsibility with food and food safety) were more likely to have eaten seaweed in the past, had consumed seaweed more frequently in the past 12 months and were more likely to consume seaweed in the next 12 months. Seaweed consumption was more frequent and likely for those who assign symbolic value to food and for those who are more health-conscious. While snacking behaviour did not influence having eaten or tasted seaweed, people with a higher propensity to snack had consumed seaweed more frequently in the past 12 months and are more likely to consume seaweed in the next 12 months.

The majority of Australian consumers have eaten seaweed, however only 37% have consumed seaweed at least once per month in the past 12 months. Just less than two-thirds of Australian consumers (62%) report that it is likely they will consume seaweed in the next 12 months, indicating that Australian consumers are moderately receptive to seaweed products.

Our findings indicate that younger consumers, people with higher household incomes and those with higher levels of education are more likely to consume seaweed. Moreover, females report higher levels of consumption in the past 12 months. Thus the well-educated, younger female (under 35 years of age) is a key target market for seaweed products. Developing convenient and sophisticated seaweed products that would appeal to this demographic will be critical to the success of an Australian seaweed industry.

In keeping with the literature (e.g. Prager 2017), health and nutritional benefits were identified as the most relevant reason for consuming seaweed. More health-conscious consumers are a primary market for seaweed meaning that new product development and marketing campaigns need to accentuate and emphasise the significant health and nutritional benefits that can be derived from seaweed consumption. The environmental and sustainable benefits of seaweed

were considered to be relevant reasons for eating seaweed. People who are more mindful in their food consumption choices being concerned about the environmental impacts of food as well as food safety issues are more likely to eat seaweed. Hence, harvesting, production and processing of seaweed products and marketing claims and promotional appeals need to reflect this desire for more sustainable and safer food. Australian consumers do not appear to be too concerned about the safety of seaweed or the potential for bacterial or chemical contamination. Nevertheless, safety and quality procedures and regulations, such as those developed in France will be required to remove potential risks of consumption (CEVA 2014).

Consumers of seaweed are less likely to be neophobic and more likely to be adventurous with food and willing to try new products. This finding is in keeping with a study in Norway which revealed that younger consumers with high food innovativeness are more likely to consume a novel food product such as sushi (Altintzoglou, et al. 2016). Providing opportunities for trial and development of innovative seaweed products will appeal to these neophilic consumers. Moreover, facilitating trial and experimentation by ensuring seaweed products are featured on menus, cooking shows and websites and recipe books will encourage consumption by these more adventurous food consumers. Conversely, neophobia has been identified as a major obstacle for consuming seaweed. Managing the sensory characteristics of seaweed including smell, appearance and texture will be critical to wider market acceptance. Avoiding aversion or disgust by disguising seaweed as a minor ingredient in other more familiar products may overcome this barrier. Identifying more palatable seaweed products will lead to consumer acceptance (Chapman et al. 2015).

Seaweed consumers are also more likely to assign symbolic value to food choices, and therefore capitalising on the association of “you are what you eat” and the potential for seaweed to be considered to be a chic or trendy food choice should drive promotional appeals for new seaweed products. Finally, seaweed consumption is linked to a propensity to snack, representing an opportunity for the seaweed industry to develop healthy, tasty and convenient seaweed snacks that would appeal to key target markets.

The most critical barrier to seaweed consumption was related to lack of familiarity and knowledge of the product category. Hence, educating consumers on where to buy the product, how to store it, how to prepare and serve it and providing appealing recipes is critical to increasing seaweed consumption. Other barriers to seaweed consumption include lack of availability and affordability. Hence, overcoming these perceptions will rely upon developing affordable seaweed foods that represent value for money and gaining wider distribution in mainstream food outlets.

To the best of our knowledge, this is the first academic paper to have measured consumers’ current consumption of seaweed and perceived drivers and barriers to seaweed consumption, as well as the influence of key psychological variables. We tested a model of seaweed consumption that includes drivers and barriers along with moderating variables based on demographic differences and mediating variable based on relevant psychological variables including

neophobia, health-consciousness, symbolic value, responsibility with food and food safety and snacking behaviour. This model will provide a framework for further studies of seaweed consumption. In particular, we have strengthened understanding of influences on consumption of novel and unfamiliar foods within the context of seaweed.

This research provides valuable insights into consumer preferences for a diverse range of seaweed products. The findings have uncovered key barriers and drivers for expanding seaweed consumption, allowing prioritisation of research agendas and marketing efforts. A profile of the seaweed consumer has been developed and will allow more targeted product development and marketing activities. A business case for the potential for seaweed to become a new industry in Australia can be developed based on this information. This study is confined to an online national survey of 521 Australian consumers. Future research can build on the findings of this study by involving larger samples and integrating additional scientific and marketing information to expand the knowledge base used for developing the present survey with bespoke lines of questioning.

Game Theory And Edible Seaweed: Improving Information And Overcome Neophobia In Western Countries

Chema Losada-Lopez, Paulino Montes-solla & J. Andres Faiña

Abstract

1. INTRODUCTION

Edible seaweeds are well established as food products in Asian markets; while suffering from a very poor image as human food and being mainly considered as agricultural fertilizers or either as animal food in Western cultures. However, in Europe the number of new food products containing seaweeds launched into the market has increased rapidly in the last few years. In fact, the percentage of seaweed-food- product launches into the European market shows a sharp increase from 14% in 2010 to 24.5% in 2015 (MINTEL Data Base, 2015).

In this context, the main aim of this paper is to present a conceptual “Alphabet model” in order to gain a deeper understanding of seaweeds’ consumption in Europe. More specifically, the Alphabet model is enhanced with a signalling game through which agents –such as large food base retailers and/or other recommenders- send a credible cue about edible seaweeds as having some sea-vegetables attributes -taste -when properly cooked- and wellness- highly advisable for human nutrition.

2. NEW PRODUCT AND MARKET OVERVIEW

Most of the edible seaweeds produced in Europe are consumed locally, but there is an increasing demand in Spain and France for human consumption (Marine Institute, 2013, P 9-10). Moreover, seaweed food for human consumption is only a small portion, which is often not gathered by national and international statistical sources (Marine Institute, 2005, P 89).

In the present study, we propose that the success of the seaweed industry depends on product development and marketing strategies; and more specifically, companies should focus on the creation of attractive and nutritious seaweed food products that can be considered as tasty sea-vegetables suitable for human consumption. In addition, seaweed companies could stress their low calorie value, meeting the increasing demand for fat-free and low-calories products in Western countries. However, this would be an effort-consuming and long-term marketing strategy, and in many cases would require shifting gastronomic culture and food habits, as well as consumers’ perception.

New product development strategies are mainly focused on functional food and beverages, instead of focusing on radical food innovations which are breaking into the market. In this context, in the present study we suggest that more information and in-store promotional activities are required in order to break into new markets; as well as new branding strategies and accreditation of the desired characteristics and attributes of edible seaweeds as human food.

Other lines of product development are targeted to the acquisition of new knowledge and the development of new skills to produce commercially attractive seaweeds, derived products or flavour ingredients for the food industry. That is, building a knowledge base and capability to evaluate taste and flavour; formulating product concepts, developing cooking and processing methodologies; and designing a range of finished products (Hotchkiss, 2010, p 1).

Bouga and Combet (2015) explored the functional potential of seaweeds in the UK taking also into account some possible risks like high exposure to iodine, contaminants and toxic compound, providing detailed information about the presence of seaweed products in some specialized shops and to a lesser extent in large retailing. Following Bouga and Combet (2015) further research is needed in seaweed products consumption behaviour, in terms of demographics and drivers of purchase intention. In addition, and according to Watson and Walsh (2011), in-store promotional activities and consumer information campaigns are required in a context of increasing consumer demand and interest in seaweed food products, as well as to increase trust and confidence on the retailer. More specifically, these authors highlighted that the industry should develop communication activities stressing the nutritional values, providing cooking guides and general information among producers and their retailers. That is, promotional material could focus on issues such as nutritional value and gourmet attributes, targeting to some specific market segments, such as vegetarians, foodies and healthy consumers. In this vein, previous research suggests that one single committed retailer in the healthy-food sector could generate important sales by providing advice and testimonials to consumers (Watson and Walsh, 2011, p 21).

Moreover, seaweeds, or better sea vegetables, are being increasingly used in some top restaurants by famous and well-known chefs. Sea-vegetables have also spread from the upper part of restaurant industry to larger medium and medium-low segments.

Following Watson and Walsh (2011), seaweed products are unlikely to make a significant crossover from niche markets to conventional ones. However, evidence from new market food products launchings supports a rapid increase in the number of new products introduced in the European food retailing industry. In the last two years (2014-2015) new launchings of seaweed products in European countries growth faster than in Asian countries, being the supermarket channels the most active segment with 39.5% increase (MINTEL Database, 2015).

3. INNOVATION AND INFORMATION IN AGRIFOOD INDUSTRY

The importance of credibility in predicting consumers' attitudes and purchase intentions has been proved in a considerable number of studies. However, the fact that seaweeds' taste and texture depends on cooking knowledge and techniques, as well as on experimentation and learning by doing can entail relatively high costs for most consumers. Consequently, seaweeds' taste and texture could be considered as credibility attributes by consumers.

According to Cox (1967), the cue utilization theory explains how consumers can indirectly evaluate a product based on the information available or on attributes used as quality indicators, which are usually called cues. Cox (1967) pointed out that consumers may reduce the uncertainty and the lack of credible information by choosing one or more cues as a basis for their evaluation

of product quality by means of an inference about the product's attributes. Then, consumers will form an impression about the product from the salient product attributes.

From the consumers' standpoint, the information economy provides a helpful insight in what regards the interaction game played between an interested informant who claims or states some properties of a product attributes and a consumer, with no possibility of checking whether the claimed attributes are real or not. Distrust reduces the credibility of the message and games with asymmetric information can hinder market transactions. In agro-food industry safety and suspicion, problems can prevent willingness to buy and entail important consumption barriers.

Information asymmetry between innovative producers and consumers undermines the credibility of suppliers' commercial information, because when consumers are not able to detect problems in new products, innovative producers could have strong incentives to launch new products to market before bugs and flaws are completely fixed. Furthermore, producers and suppliers cannot early detect products flaws.

The dashed oval line connecting the two nodes of consumer decision when the product is good or has a fault means that the consumers do not have enough information to distinguish between these two possibilities. So, consumers only know that both situations are possible and that only the producer -interested in selling the product- may know them. In fact, consumers only have a single choice -to buy or not buy-, but they know that there is a risk that the product may have faults in some of its attributes.

3.1. CREDIBLE SIGNALLING IN INFORMATION GAMES

This situation changes when a third party with enough knowledge and commercial interest directly engaged with the good quality and attributes of the product comes into play. In the specific case of seaweeds and other new foods, specialty food retailers (R) – and also chefs in fine restaurants- play this key role. The credibility of this new information allows consumers to infer about the true relationship between real and claimed product attributes.

3.2. A COMPLETE MODEL

According to Lee and Yun (2015) health and wellness became widely shared consumption values. An increasing number of consumers are strongly concerned about nutritional and wellness- related attributes of food in an attempt to follow a healthy diet that can decrease the risk of obesity and chronic diseases.

To some extent, seaweed and organic food offer a richer and healthier nutritional content and numerous recent developments to better understand organic and environmental concerns in food consumption can be extended to seaweed products. In fact, in a completely opposite way to organic and environmental friendly products, seaweed food is a rather radical innovation in the Western culture, where the eating habits and gastronomic culture suffers from the ignorance and suspicion often linked with innovation in the agro-food industry.

A sociological model of environmental behaviour can be used as an overall conceptual framework for explaining consumers' behaviour, the Attitude-Behaviour-Context (ABC) theory (Guagnano et al., 1995). Guagnano et al. (1995) demonstrated that to take into account contextual factors that may facilitate or prevent actions is crucial to predict behaviour (Guagnano et al., 1995; Zepeda & Deal, 2009). So, ABC theory is compatible with a Health Beliefs model, and it is also consistent with the means-end chain theory (Costa, Dekker, & Jongen, 2004; Olson & Reynolds, 2001). The Means-end chain (MEC) theory assumes that consumers choose products whose attributes, consequences and values reflect their goals; in other words, they purchase products for the functional and psychological benefits they provide.

These factors are all included in the complete model called as Alphabet Theory (Zepeda and Deal, 2009) originally designed for studying organic products demand. Explicitly linking the VBN (Value, Beliefs, Norms) and ABC (attitude, behaviour, context) theories and introducing the elements Demographics (D), knowledge (K), information seeking (IS) and habit (H) into this theoretical framework results in the VBN-ABC-D-K-IS-H theory, or more precisely the Alphabet Theory (Figure 1). Incorporating Stern et al.'s (1999) VBN theory and Guagnano et al.'s (1995) ABC with knowledge, information seeking and habit. Alphabet Theory offers a consistent framework for analysing consumer behaviour driven by values, beliefs and the creation of norms, such as the case of organic food and probably seaweed food products (Zepeda, L. and Deal, D. 2009).

In such a way, we have adapted Zepeda and Deal formulation to explicitly introduce a credible signalling on the reliability of the positive attributes declared for new food products. Figure 1 shows the Alphabet model completed with a credible cue on the true attributes of a new product offered by top chefs in upper scale of gourmet restaurants.

The meaning of a reliable agent sending a credible signal on the true attributes of a new products goes much further than usual practices of product recommendation issued by experts in the fields. The latter put at risk their reputation but can be generously paid by producers and suppliers, but when a qualified expert sends a credible unambiguous signal through a separating equilibrium in an information game, as it is the case with retailers, specialized shops and top chefs in gourmet restaurants, what is at stake is the thriving of their own business.

4. REFERENCES

- Bouga, M. and Combet, E. (2015), Emergence of Seaweed and Seaweed-Containing Foods in the UK: Focus on Labeling, Iodine Content, Toxicity and Nutrition, Foods, ISSN 2304-8158, www.mdpi.com/journal/foods, 2015
- Hotchkiss, Sarah, (2010) 'Investigation of the Flavouring and Taste Components of Irish Seaweeds', Marine Institute, 2010, Marine Institute, Marine Research Sub-Programme (NDP 2007-2013), Series, <http://hdl.handle.net/10793/73>
- Hyun-Joo Lee and Zee-Sun Yun (2015) Consumers' perceptions of organic food attributes and cognitive and affective attitudes as determinants of their purchase intentions toward organic food, Food Quality and Preference 39 (2015) 259–267.

- Marine Institute (2013). Development and Demonstration of Viable Hatchery and Ongoing Methodologies for Seaweed Species with Identified Commercial Potential. Marine Research Sub-Programme 2007-2013; PBA/SW/07/001.
- Marine Institute (Foras na Mara)/ Douglas-Westwood Limited (2005), Marine industries global market analysis, Marine Foresight Series No.1, March 2005.
- Nie, C. and Zepeda, L. (2011), Lifestyle segmentation of US food shoppers to examine organic and local food consumption, *Appetite* 57 (2011) 28–37.
- Radmunsen, E., *Games and Information: An Introduction to Game Theory*, Blackwell Publishing, 2001.
- Siro, I., Emese, K., Beata, K. and Lugasi, A. (2008). 'Functional Food. Product development, Marketing and Consumer Acceptance – A Review'. *Appetite*. Vol. 51, Issue 3, 456-467.
- Watson, L. and Walsh, M. (2011). A Market Analysis towards the Further Development of Seaweed Aquaculture in Ireland. BIM. 49pp.
- Zepeda, L. and Deal, D. (2009), *International Journal of Consumer Studies*, vol. 33.

Difference In The Evolution Of Risk Perception And Risk Attitudes Of Canadian Venison Consumers

Merlin Uwalaka & Ellen Goddard

Abstract

Chronic wasting disease is prion disease affecting in North America and recently some parts of Europe (Finland and Norway). Because some members of the population consume venison, there is a risk to human health. The public's perception and attitude towards this risk would affect consumer behavior and consumption decision. This study explores changes over time in risk perceptions and risk attitudes of two groups of the Canadian public (venison consumers and non-venison consumers) using data from stated preference surveys. The study also evaluates how announcements of increased possibility of human infection affects risk perception and risk attitude in different consumer groups. Perception scores were found to be higher among non-consumers, and risk attitude scores were higher for venison consumers. Risk attitude and risk perceptions were also higher in the year after the announcement about human infection was made.

Purpose of the Research

This study aims to ascertain if the changes in food safety risk perception and risk attitude for Canadian venison consumers are higher in 2018, after new recommendations regarding increased risk of venison consumption. If the new recommendations have caused changes in either risk perceptions or risk attitudes, there would be an expected changes in venison consumption as risk perception and risk attitude is expected to affect consumption decisions.

This study aims to analyze whether risk perceptions and risk attitudes towards venison have changed over time and which (attitude or perception) changes more using data from independent surveys conducted in 2009, 2011, and 2018.

Motivation and Support

Consumption and purchase decisions are influenced by numerous factors including price, quality, and demographic characteristics. However, in the case of food safety incidents psychological factors like food safety risk perceptions and risk attitudes become important (Pennings et al., 2002; Schroeder et al., 2007). Risk perceptions can be defined as the consumer's perception of the uncertainty of a threat while risk attitude is the consumer's predisposition towards risk (Pennings et al., 2002).

Currently, deer in Canada, United States, Finland and Norway are being affected by Chronic Wasting Disease (CWD). CWD is a fatal neurological disease with no current vaccine or cure. Some but not all members of the public eat venison from hunted or purchased sources. Risk perceptions and risk attitudes may be driving the decision to eat or not eat venison and this may be changing in response to the presence of CWD.

Previous studies have shown that risk perceptions and risk attitudes affect consumption of meat; the higher the risk perception, the less likely the individual/group is to consume meat. If

they choose to consume meat, they are more likely to reduce consumption by a higher amount in the event of a food safety issue (Myae 2011; Muringai and Goddard, 2017; Pennings et al. 2002; Schroeder et al. 2007; Tonsor et al., 2009 Lusk and Coble 2005).

While demographics like age, income and educational background factors have been found to influence risk perceptions and risk attitudes (Tonsor et al., 2009; Dosman et al., 2001; Myae and Goddard 2011), other factors like personal experience, trust in government agencies and media coverage influence risk perceptions and attitudes (Tonsor et al., 2009; Wählberg and Sjöberg, 2000; Muringai and Goddard, 2017; Muringai and Goddard, 2011; Myae and Goddard 2011;).

Initially, the Canadian Food Inspection Agency (CFIA) advised the public “not to consume high risk materials, such as brain, spinal cord, and offal” of CWD infected animals (Kahn et al., 2004). However, in the light of recent scientific research (macaque monkeys exhibiting CWD after eating venison from CWD infected animals), the CFIA website currently states that “any tissue which may come from any CWD-infected cervid should not be used or consumed by humans” (CFIA, 2018). Health Canada was also prompted to issue a warning in April 2017 stating that “the potential for CWD to be transmitted to humans cannot be excluded” (Health Canada, 2017).

A study by Myae and Goddard (2010) showed that consumers are highly concerned about CWD food safety issues and respond promptly to media reports by switching consumption from venison to bison/beef at the time of CWD reports between 2002 and 2008. Therefore, the recent announcement about potential spread to humans may have altered risk perception/risk attitude towards venison consumption in Canada since they are related to the expected effects on human health. (Penning et al., 2002; Schroeder et al., 2007; Myae, 2011; Muringai and Goddard, 2017; Yang and Goddard, 2011).

Data and Methodology

Data is collected from three stated preference surveys. The surveys were conducted in 2009, 2011, and 2018 using online panels. The data from 2018 is exploratory data from a pretest with 500 respondents. Following Pennings et al. (2002) and Schroeder et al. (2007), specific questions were asked to ascertain respondents’ risk perceptions.

The questions used in this study were as follows:

- I. When eating venison I am exposed to (1. very little risk ... 5. high risk).*
 - I. I think eating venison is risky (1. strongly disagree ... 5 strongly agree).*
 - II. For me eating venison is (1. not risky ... 5. risky)*
 - III. For risk attitudes, the following questions were asked:*
 - I. I accept the risks of eating venison (1. strongly disagree ... 5. strongly agree).*
 - II. III.*
 - For me eating venison is worth the risk (1. strongly disagree ... 5. strongly agree).*
 - I am ... the risk of eating venison (1. not willing to accept ... 5. Willing*

The responses to these questions are used to calculate risk perceptions and risk attitude scores. We calculated risk perception and risk attitude scores by taking the averages of responses

in each category. Data were collected on whether or not the respondents eat venison, demographic characteristics, and CWD knowledge.

Findings

Figure 1: Proportion of individuals who responded yes/no to “. Have you, or has any member of your household, ever eaten venison (meat from deer, elk or moose)?”

The results show that risk perceptions are generally higher for those who do not eat venison compared to those who do. This implies that venison consumers perceive a lower risk from consumption. On the other hand, venison consumers have higher risk attitude scores which means they are more likely to accept the risk of eating venison.

From table 1, risk perception has changed during the years in the study, with 2.3 in 2009, 2.24 in 2011, and 2.45 in 2018. However, as expected, the change in risk perception between 2009 and 2018 is less than the difference between 2011 and 2018 (after the change in consumption and health recommendations which occurred in 2017).

On the other hand, for the respondents who do not eat venison, there is no statistical difference between the risk perceptions - 3.07 for 2009, 3.13 for 2011, and 3.14 for 2018. The concern for venison food safety does not vary for respondents who do not eat venison because they are not exposed to food safety risks if they do not eat venison at all. Therefore, changes in risk level would not affect risk perception at the same extent.

	2009		2011		2018	
	Eat Venison	Not eat Venison	Eat Venison	Not eat Venison	Eat Venison	Not eat Venison
Risk Perception	2.30 (0.032)	3.07 (0.051)	2.24 (0.016)	3.13 (0.020)	2.45 (0.058)	3.14 (0.077)
Risk Attitude	3.48 (0.035)	2.52 (0.053)	2.63 (0.012)	2.37 (0.013)	3.25 (0.057)	3.32 (0.073)
Count	1243		6916		500	

Table 1: Mean of Risk perception and risk attitude indices across years for different consumer groups

Contributions to Theory and Practice

The results are consistent with previous studies (Pennings et al., 2002; Schroeder et al.2007; Myae 2011; Muringai and Goddard, 2017; Tonsor et al., 2009 Lusk and Coble 2005). Risk Perception and risk attitude are tied to consumption habits. Non consumers have a higher perception of risk than consumers and are less likely to accept risks. Changes in risk perception between 2011 and 2018 were higher than between 2009 and 2011. This might be due to new information about the potential health effects of CWD. In the risk management procedure, communicating research information to the consumer can alter risk perceptions and in turn consumer behavior. Therefore, it is important to understand the extent to which the new information does change risk perceptions for the government to be able to conduct effective risk communication and management.

Selected References

- Dosman, D., Adamowicz, W., & Hrudey, S. (2001). Socioeconomic Determinants of Health- and Food Safety-Related Risk Perceptions. *Risk Analysis*, 21(2), 307-318. doi: 10.1111/0272-4332.212113
- Lusk, J., & Coble, K. (2005). Risk Perceptions, Risk Preference, and Acceptance of Risky Food. *American Journal Of Agricultural Economics*, 87(2), 393-405. doi: 10.1111/j.1467-8276.2005.00730.x
- Lusk, J., & Coble, K. (2005). Risk Perceptions, Risk Preference, and Acceptance of Risky Food. *American Journal Of Agricultural Economics*, 87(2), 393-405. doi: 10.1111/j.1467-8276.2005.00730.x
- Muringai, V., & Goddard, E. (2017). Trust and consumer risk perceptions regarding BSE and chronic wasting disease. *Agribusiness*, 34(2), 240- 265. doi: 10.1002/agr.21524
- Muringai, V., Goddard, E., & Aubeeluck, A. (2011). Consumers' Understanding and Concerns About Bovine Spongiform Encephalopathy (BSE): Comparison Among Canadian, American, and Japanese Consumers. *Journal Of Toxicology And Environmental Health, Part A*, 74(22-24), 1592-1608. doi: 10.1080/15287394.2011.618986
- Myae, A., Goddard, E., & Aubeeluck, A. (2011). The Role of Psychological Determinants and Demographic Factors in Consumer Demand For Farm-To-Fork Traceability Systems. *Journal Of Toxicology And Environmental Health, Part A*, 74(22-24), 1550-1574. doi: 10.1080/15287394.2011.618983
- Pennings, J., Wansink, B., & Meulenberg, M. (2002). A note on modeling consumer reactions to a crisis: The case of the mad cow disease. *International Journal Of Research In Marketing*, 19(1), 91-100. doi: 10.1016/s0167-8116(02)00050-2
- Schroeder, T., Tonsor, G., Pennings, J., & Mintert, J. (2007). Consumer Food Safety Risk Perceptions and Attitudes: Impacts on Beef Consumption across Countries. *The B.E. Journal Of Economic Analysis & Policy*, 7(1). doi: 10.2202/1935-1682.1848
- Tonsor, G., Schroeder, T., & Pennings, J. (2009). Factors Impacting Food Safety Risk

- Perceptions. *Journal Of Agricultural Economics*, 60(3), 625- 644. doi:
10.1111/j.1477-9552.2009.00209.x
- Wahlberg, A., & Sjoberg, L. (2000). Risk perception and the media. *Journal Of Risk Research*, 3(1), 31-50. doi: 10.1080/136698700376699
- Yang, J., & Goddard, E. (2011). Canadian Consumer Responses to BSE with Heterogeneous Risk Perceptions and Risk Attitudes. *Canadian Journal Of Agricultural Economics/Revue Canadienne D'agroeconomie*, 59(4), 493-518. doi:
10.1111/j.1744-7976.2011.01225.x

Consumers' Behaviour In Domestic Wine Purchase: A Field Experiment

Tomić, Marina; Kovačić, Damir; Cerjak, Marija

Abstract

We are living in a time of abundant choice. and customers have a huge range of options in many kinds of products, especially in the food sector. Additionally, domestic manufacturers have to face intensive global competition. Therefore, people become more concerned about the survival of their own cultures, which strengthen the ethnocentric trend. Consumer preferences for foreign or domestic product is product specific. Since the wine origin plays very important role in consumer preference, the present study focused on wine.

The aims of this research were to investigate drivers of behavior in domestic wine purchase using Theory of Planned Behaviour, to investigate willingness to pay for domestic wine and to examine the relation between behaviour in domestic wine purchase and willingness to pay for domestic wine.

This study was conducted in 2015 in Zagreb, Croatia using mall-intercept method. Face to face survey involved 315 wine buyers over the age of 18, while field experiment was done among 84 respondents, wine buyers. Structural Equation Modeling by Partial Least Squares was used to analyse the collected data.

Theory of planned behaviour performed well, with attitudes, subjective norm and perceived behavioural control explaining about 50% of the total variance in the intention, while intention and perceived behavioural control explained 37% of the variability in behaviour in domestic wine purchase. The results showed that subjective norm is the strongest predictor of the intention, while the intention and perceived behavioural control have strong and equal impact on behaviour in domestic wine purchase.

Results of this research showed that most of the respondents will choose domestic wine if the price of domestic and foreign wine is equal. However, increasing the price of domestic wine decreased the willingness to pay more for wine of domestic origin. There is no statistically significant relation between behaviour in domestic wine purchase and the willingness to pay more for domestic wines, which means that more frequent domestic wine purchase does not increase the respondents willingness to pay more for domestic wines.

This survey provides valuable informations for all stakeholders on wine market in order to develop communication strategies.

A Focus Group Exploration of Parents' Commercial Weaning Food Purchase Intentions in Malaysia

Hajar Mohamad, Miranda Miroso, Phil Bremer & Indrawati Oey

Abstract

Background

For many families, the introduction of commercial baby foods begins early in life, with infants receiving commercial baby foods by the age of 6 months. The introduction of solid foods, weaning, is the transitional period of an infant's life where a milk-based diet no longer meets the nutritional needs of the growing child (Carstairs et al., 2016). Although the use of home-prepared baby foods is recommended (Food Standards Agency, 2008), the usage of commercial baby foods during weaning period is widely practiced. This practice is common especially in western countries (Siega-Riz et al., 2010; Foterek et al., 2014). The 2011 UK Diet and Nutrition Survey in Infants and Young Children found that 58% of 4–18-month old children on solids had eaten a commercial baby or toddler meal over the 4-day survey period (Lennox et al. 2013). Commercial baby food is also common in Germany where 55% of 6–12-month-old infants eat them instead of homemade meals (Foterek et al., 2014). Similarly, in the United States, it has been reported that 73–95% of infants between 4–12 months consume commercially produced baby foods (Briefel et al., 2004). Commercial baby food is also being widely purchased in Asian countries. In Malaysia, the sales of the commercial weaning food category in 2017, by value, were \$31.9 million with an overall increase of 3.6% compared to 2016 (Euromonitor, 2017).

Literature suggested several reasons for the purchase and usage of commercial baby food products. These influences include maternal age, a method of feeding, the presence of other children in the household, region and food availability (Betoko et al., 2013). The availability of commercial food products in the market provides parents with a convenient alternative to home-cooked family meals (Maguire et al., 2004; Synnott et al., 2007). Even though homemade is seen as the ideal option, commercial foods can provide a variety of flavours to help identify and develop infants' preferences (Hoddinott, 2010). The increase in their usage may reflect modern lifestyles are becoming busier, with less home cooking taking place, leading to an overall increased reliance on ready-made foods across all ages (Jabs & Devine, 2006).

Commercial baby foods are, in general, an accessible, non-perishable and portable option of feeding (Maslin et al., 2015). Commercially prepared baby foods, also known as 'readymade' baby foods, are typically mass produced and purchased in a pre-prepared format requiring minimal, if any, cooking or heating before consumption (Maslin & Venter, 2017). Nevertheless, there are several concerns regarding the increased dependence and confidence on commercially produced baby food. Results from previous studies were specifically reduced dietary variety, taste profile, differing nutritional content and reduced microbial load (Garcia et al., 2013, Foterek et al., 2015). Based on the findings by Synnott et al (2007), health was considered the most important issue, followed by taste and organic ingredients in Germany, Scotland and Sweden. In

Italy, health was also considered the most important issue, followed by the method of production and brand and in Spain, health was considered the most important issue, followed by taste and brand when purchasing for the infant.

Parental attitudes, behaviour and concerns about these issues have not been studied in Malaysia. Based on Maslin et al. (2015), there are important factors and issues to take into consideration when examining the use of commercial baby foods such as the parental experience of weaning and reasons for choosing, introducing and purchasing particular foods.

A better understanding of parental attitudes and purchasing behaviour regarding commercial weaning foods will enable health practitioners and government to tailor their advice on this food category and potentially inform industry to develop more suitable products. Therefore, this study aimed to use a qualitative approach to gain insight into parental purchasing behaviour, specifically on commercially produced baby food. The objectives are to understand parents' current food purchasing behaviours/habits regarding commercial weaning foods and to understand the factors underpinning parents' willingness to purchase commercial weaning foods. The use and purchase of commercially produced baby foods are the focus of the current study.

Methods

The Theory of Planned Behavior (TPB) (Ajzen, 1991) was used in this study to explore intention to purchase as well as purchasing behaviour of commercial weaning food products among Malaysian parents. The TBP was used to explore factors including attitudes, subjective norms, and perceived behavioural control. A semi-structured focus group discussion guide was developed according to TPB framework, which consists of a list of questions and probes, relevant to the areas to be elucidated, based on the framework and influenced by themes identified throughout the literature. Questions were designed to stimulate discussion about commercial weaning food products. Additional probe questions were used to gain rich, detailed information and to encourage participants to clarify or expand on views expressed. The questions elicited information about attitudes for the positive and negative attributes of commercial weaning foods; subjective norms about the effects of information from different sources on consumer purchase decision and perceived behavioural control comprising barriers and facilitators related to purchasing of commercial weaning foods. The focus group discussion guide was subsequently be translated into the Malay language as the focus groups were discussed using the native tongue of participants in Malaysia.

Focus groups were conducted in two states of Malaysia, Sabah and Selangor. Participants consisted of parents that currently had a child aged three years old or under who regularly purchase commercial weaning foods or expectant parents that will buy commercial weaning foods in the future. Participants were locally recruited using a purposive convenience sampling strategy which was combined with a snowballing technique to recruit additional participants. While both fathers and mothers were eligible for inclusion, only one parent could participate. All parents were invited to participate in the study via phone and follow up to arrange session times and location.

Seven focus groups were conducted between July and August 2016. The focus groups were conducted in Malay and facilitated by one moderator (principal researcher) with the help of an

assistant and focus group discussion guide. Data on socio-demographic characteristics of participants including age, the highest level of education, child dependents, occupation and monthly income were also collected prior to the commencement of the session. Examples of some commercial weaning food products that are currently available in the market were also provided to stimulate the discussion. Participants were encouraged to discuss their responses until no further views were expressed openly. Each session was recorded using two audio recorders and was approximately one hour in duration. The focus groups transcripts were analysed using thematic analysis deductive approach. All transcribed data were coded using the qualitative software package NVivo 11.

Results and discussion

Seven focus groups ranging in size from 5-10 participants were conducted. The study population sample (44 participants) was predominantly mother (female=30, male=14), aged between 23-52 years old (mean=30-39 years old) and ranged from first time expectant parent to parent with seven children (mean=2 children). Figure 1 provides an adapted framework from TPB with emergent themes across TPB categories.

Numerous attitudes were revealed. When asked about things associated with commercial weaning foods, the majority of the comments related to the positive use of the product. The parents stated that commercial weaning food products are easy and convenient for them to use to feed the baby (n=28). This commercial product is handy especially during travelling, when there is no time or energy to cook as well as for snack. Product attributes (n=25) was discussed as to have positive attributes of commercial weaning foods, as well as a negative aspect. Positive product attributes were noted, including that it has various flavours and tasty. However, there was also negative product attributes emerged where the sugar content level is considered high in the product, and it became a concern to the parents. As the Malaysian parents are very particular about the Halal product, a product with Halal certified are preferable compared to a product with no Halal certification. The consumption of commercial weaning products was also affected by the reactions and suitability for the babies (n=19). Parents reacted positive attitude towards the product when the product is likeable by the babies and can be consumed without any problem.

When considering subjective norms, opinions and experiences from family and friends (n=35) appeared as the main influencer to the parents to purchase commercial weaning foods. The internet and social media (n=21) emerged as positive as well as a negative influence. Some parents were not influenced by the social media as they were sceptical with the information spread through social media. Nevertheless, a few parents were affected by social media and affect the purchase of commercial weaning food. Health professionals' recommendation and advice (n=16) also emerged as subjective norms, as parents stated their purchase of commercial weaning foods would be determined by their health professionals' advice. However, a few of the parents indicated that they did not follow their advice as their opinions were different.

The major obstacles participants identified related to what would make it hard to purchase commercial weaning foods included the brand of the product (n=29) and the availability and options of the product (n=17). Malaysian parents prefer product brand that they are familiar with and well known. When discussing what would make it easy to purchase commercial weaning

food, the parents pointed out to increase the availability, convenience and options of the product as not all products available in the supermarket.

Intentions for purchasing commercial weaning food over the next month was mixed, with most parents intending to purchase regularly as part of their babies' diet while the others indicated that it depends on the product, situation and babies. Overall commercial weaning food purchasing behaviour was influenced both positively and negatively by attitudes, subjective norms and perceived behavioural control.

Conclusions

The TPB provided a useful framework for exploring the major determinants of purchase intention patterns. The use of focus groups does permit the gathering of relevant qualitative data for the subject in the study and the TPB model, and its measures were suitable as a framework to guide questioning and analysis.

Some limitations of the current paper and opportunities for future research are worth mentioning. First, the study considers a specific product category, commercial weaning foods so that the findings could be different for different product categories. Additionally, future researchers could compare parents who prefer and do not prefer commercial weaning food products to examine the different characteristics of these two groups and how their attitudes and behaviours differ for both. Second, a longitudinal approach is suggested as part of the research methods for further research to ascertain changes in attitude and purchase intention. Such an approach would be very useful in observing the reactions of parents who intend to purchase more commercial weaning food products and could also help understand how the behavioural intentions and attitudes are developed and influenced. Finally, a small sample was used including parents based in two different locations in Malaysia meaning that results cannot be generalised to the whole population of Malaysia. Future studies may include samples from a diverse demographic population for more informed findings.

This study provides a proof of concept indication that information on commercial weaning foods may improve attitudes towards weaning food products and may thus be an important target for a manufacturer seeking to increase purchase and produce of this food group. The study is important for the companies who are involved in marketing because it determines the important factors that influence the consumer intention to purchase commercial weaning foods. By being aware of these factors, companies can identify the potential problems and take corrective action to meet consumer needs and wants and, in turn, increase their profits. Marketers and the government need to provide consumers with appropriate or relevant information to help them make satisfactory food choices.

References

- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Betoko, A., Charles, M. A., Hankard, R., Forhan, A., Bonet, M., Saurel-Cubizolles, M-J., Heude, B., & de Lauzon-Guillain, B. (2013). Infant feeding patterns over the first year of life: Influence of family characteristics. *European Journal Clinical Nutrition*, 67, 631-637.

- Briefel, R., R., Reidy, K., Karwe, V., & Devaney, B. (2004). Feeding infants and toddlers study: Improvements needed in meeting infant feeding recommendations. *Journal of the American Dietetic Association*, 104, 31-37.
- Carstairs, S. A., Craig, L. C., Marais, D., Bora, O. E., & Kiezebrink, K. (2016). A comparison of preprepared commercial infant feeding meals with home-cooked recipes. *Archives of Disease in Childhood*, 101, 1037–104.
- Euromonitor International. (2017). Baby food in Malaysia. August 2017. Accessed 1.9.17.
- Food Standards Agency. (2008). Your baby. Feeding your baby in the first year. May 2008. Accessed 12.10.16.
- Foterek, K., Hilbig, A., & Alexy, U. (2014). Breast-feeding and weaning practices in the DONALD study: age and time trends. *Journal of Paediatric Gastroenterol Nutrition*, 58 (3), 361-367.
- Foterek, K., Hilbig, A., & Alexy, U. (2015) Associations between commercial complementary food consumption and fruit and vegetable intake in children. Results of the DONALD study. *Appetite*, 85, 84-90
- Garcia, A. L., Raza, S., Parrett, A., & Wright, C. M. (2013). Nutritional content of infant commercial weaning foods in the UK. *Archives of Disease in Childhood*, 98, 793–797.
- Hoddinott, P., Craig, L., Britten, J., & McInnes, R. (2010). A prospective study exploring the early infant feeding experiences of parents and their significant others during the first 6 months of life: what would make a difference, a report for the Scottish Government. NHS Health Scotland, Edinburgh.
<<http://www.healthscotland.com/uploads/documents/13993-RE031FinalReport0809.pdf>>. Accessed 22.2.2017.
- Jabs, J., & Devine, C. M. (2006). Time scarcity and food choices: An overview. *Appetite*, 47, 196-204.
- Lennox, A., Sommerville, L., Ong, K., Henderson, H., & Allen, R. (2013). Diet and Nutrition Survey of Infants and Young Children 2011. A survey carried out on behalf of the Department of Health and Food Standards Agency.
- Maguire, K., Owens, N., & Simon, N. (2004). The price premium for organic baby food: a hedonic analysis. *Journal Agricultural Resource Economics*, 29, 132–149.
- Maslin, K., Galvin, A. D., Shepherd, S., Dean, T., Dewey, A., & Venter, C. (2015). A qualitative study of mothers' perceptions of weaning and the use of commercial infant food in the United Kingdom. *Maternal and Paediatric Nutrition Journal*, 1, 103.
- Maslin, K., & Venter, C. (2017). “Nutritional aspects of commercially prepared infant foods in developed countries: A narrative review”. *Nutrition Research Review*, 30 (1), 138-148.
- Siegrist, M., Shi, J., Giusto, A., & Hartmann, C. (2015). Worlds apart. Consumer acceptance of functional foods and beverages in Germany and China. *Appetite*, 92, 87-93.
- Synnott, K., Bogue, J., Edwards, C. A., Scott, J. A., Higgins, S., Norin, E., & Adam, R. (2007). Parental perceptions of feeding practices in five European countries: an exploratory study. *European Journal of Clinical Nutrition*, 61(8), 946-956.

E-commerce Is Booming? Not For Groceries! Identifying Ways To Reduce The Perceived Risk Related To Online Grocery Shopping

Verena Visse & Julian Allendorf

Abstract

In Germany in 2016, only 1% of the food sector's revenues was earned via e-commerce (*e.g.*, GfK 2016). On a global level, only 9% of shoppers in Europe and North America purchased fresh groceries online (Nielsen 2017). The major reason shoppers put forward for not purchasing food online, was that they could not see, smell, or touch the products before purchase (Ernst & Young 2014). This applied especially to fresh produce (*e.g.*, Cho 2011), which is not only the most important category (Halaswamy and Subhas 2014), but also has a specific role in a supermarket's offer (*e.g.*, Flemming 2017).

Several studies have identified the perceived risk as the main disadvantage of online grocery retailing (*e.g.*, Chintagunta, Chu, and Cebollada 2012). However, to date, research on how this perceived risk can be reduced (*e.g.*, Biswas and Biswas 2004) is still scarce and firms lack guidance on how to increase the low rate of online grocery sales. The goal of this study is therefore to identify ways to reduce the perceived risk in the long term and improve the online shopping experience.

Our study design is twofold: First, we conducted expert interviews to obtain a detailed understanding of managers' perspectives. Based on an online experiment ($n = 525$), we analyzed the effect of showing a video of the quality control process, as well as instrumental haptic imagery, on consumers' purchase intention. Moreover, we tested for the mediation effects of the perceived performance risk and e-trust.

We find that, through its direct effect on consumers' perceived risk, a video of the quality control has a positive effect on their purchase intention. Moreover, the results reveal that instrumental haptic imagery has a significant effect on consumers' purchase intention through its direct effect on e-trust. In addition, the instrumental need for an individual's touch level influences the perceived performance risk directly. Interestingly, we find that online shopping experience has no influence on e-trust, which is contrary to Campo and Breugelman's (2015) findings.

Our research has important implications for researchers and online grocery retailers regarding how to cope with a low percentage of online food sales. If such retailers were to succeed in communicating the quality aspect of their fresh products successfully, they would have a huge potential for long-term marketplace success.

References are available upon request.

(a) Am Stadtgraben 13-15, 48143 Münster, j.allendorf@uni-muenster.de

Authors:

Verena Visse, Chair of Marketing, University of Muenster, Muenster, Germany Julian Allendorf, Chair of Marketing, University of Muenster, Muenster, Germany (a)

The Role Of Consumer Affinity To Reduce Reluctance To Buy Foreign Food Products: The Case Of Spanish Vegetables Exportation

M. Mar Serrano-Arcos, Raquel Sánchez-Fernández & Juan Carlos Pérez-Mesa

Abstract

Introduction

The Spanish horticultural production and marketing sector has reached 50 years of age. This sector is characterised by its strong export vocation. In its history, it has suffered the effects of recurring crises (i.e., economical, social and environmental), which have affected its image as the main supply area of the European Union. Many of these crises have been the inadequate of problems common to the sector; others have been attributed to this sector for no apparent reason. This study aims to analyse, from the consumer's point of view, how this supply area should break the present information asymmetry between the country of origin -production- and the destination markets -consumer- to rebuild their image and improve their position in the European market. The study of the perceived value of the final consumer about the horticultural products with Spanish origin and the developed affinity towards the same products will show inasmuch as the productive efforts being carried out in quality, public health, working conditions and environmental impact (Piedra et al., 2016) have been reflected in the market and, above all, we will be able to identify the principal variables which will allow us to correct the consumer's erroneous perception and attitude.

From a perspective orientated to the client, the consumer will perceive those improvements in quality and sustainability through the production management, supply chain and commercialization, understood as a Responsible Innovation (RI) mechanism, which includes the consumer as the main reference point for its design and upgrading of all products (Pérez-Mesa et al., 2016). Nonetheless, all those companies, which define the Spanish horticultural sector, have not been concerned with the fact that the consumers and society were not informed. For that purpose, it is necessary to deepen our understanding of the main factors. Not only does the perception from the consumers of these kind of products will be determined but also how the attitude towards the same products arises, taking into account the "*made in*" effect which has its origin in Spain. Furthermore, although there are numerous studies related to the effects of the origin country, the empirical findings are scattered due to the limited coverage of origins, brands and countries used, whereof justifies the importance of this study, which looks for covering the main markets of the different destinations of the Spanish horticultural products.

Ultimately, this study aims to contribute to the literature by investigating the formation of non-consumption responses to products of specific foreign origins. For this purpose, we will consider variables such as: product-country image, consumer affinity, perceived risk and perceived value. In addition, we will focus on the Spanish horticultural sector, as an example of a business crisis, which requires the development of a series of joint actions that overcome problems such as: the

deterioration of the image perceived by consumers or loss of an adequate positioning in the market, as a supplier of a quality, sustainable and risk-free product.

Literature review and conceptual framework

This research proposes a conceptual model focused on the analysis of the perception and attitude of the end consumer towards the reluctance to buy Spanish horticultural products, using European consumers as the unit of analysis. This model (see Figure 1) is explained based on a series of variables that reflect the possible “*made in*” effect that the origin of the products marketed may have.

Figure 1. Conceptual model

The country of origin (COO) concept, also known as the “*made in*” concept, has been broadly defined as the positive or negative influence that a product’s country of manufacture may have on consumers’ decision making and choice behaviour (Roth & Diamantopoulos, 2009). COO research have shown that a product’s national origin acts as a signal of product quality, affects perceptions of risk associated with a purchase, and influence consumer preferences (Papadopoulos & Heslop, 2003). The impact of the origin of a country on buyer perceptions and evaluations, product-country image namely, is considered as one of the most researched international facts to consumer behaviour (Papadopoulos et al., 2013). Product-country image refers to a consumer attitude to products from that country and captures “*the total beliefs one has about the products of a given country*” (Pappu et al. 2007, p. 727). Based on a tri-dimensional attitude model (cognition, affect and conation), this stream of research deals with the attitudes and perceptions towards products made-in or related to a specific country (De Nisco et al., 2016). Research into product-country image reflects that origin biases exist for products in general (Chrysoschoidis et al., 2007), for specific products (Leonidou et al., 2007) and for industrial buyers and end-consumers (Papadopoulos & Heslop, 2014).

Henceforth, the consumers’ attitude will be favourable or unfavourable depending on the product-country image perceived (Brijs et al., 2011; Wang, 2016). Moreover, when evaluating whether or not to buy foreign products, consumers’ perceptions of product-country image can result in positive or negative affect (Ettenson & Klein, 2005). Consumer affinity is often used interchangeably to refers to “affect”, “emotions”, “feelings” and literally “*emotional feeling*” (Oberecker & Diamantopoulos, 2011, p. 47), and implies a consumer attitude related to foreign countries and their products (Jaffe & Nebenzahl, 2006), the proposal that arises is: **H₁**: Product-country image has a positive effect on consumer affinity related to products originating from the affinity country. In turn, perceived image of products from a given country is an important antecedent of the level of perceived risk (Oberecker & Diamantopoulos, 2011). Therefore, it is expected that a positive product-country image can help attenuate consumers’ perceived risk. That is why the pursuing proposal is contemplated: **H₂**: Product-country image has a negative effect on perceived risk from foreign products. Moreover, theory development

from literature demonstrates that the country of origin of a product encompasses normative connotations, in the sense that consumers' decision to purchase or to avoid buying country's products, which can be regarded as a positive position -or negative- if it is against the policies, practices, or actions associated with that country (Roth & Diamantopoulos, 2009). Hence, we find the following proposal: **H₃**: Product-country image has a negative effect on consumers' reluctance to buy foreign products.

According to Campbell and Goodstein (2001) consumers might rely on extrinsic cues (e.g. price, quality or country of origin of a product) to reduce their uncertainty about consequences arising from a product purchase. Moreover, consumer will prefer familiar (i.e. affinity country and their products) options to unfamiliar when it comes to risky consumption decisions. From this perspective, Oberecker and Diamantopoulos (2008), consider an unfavourable relationship between products (from the affinity country) and perceived risk. Thus, the following proposal is delivered: **H₄**: Consumer affinity has a negative effect on perceived risk related to products originating from the affinity country. However, it is expected that consumer affinity reduce the reluctance to buy foreign products of a given country. **H₅**: Consumer affinity has a negative effect on country-based reluctance to buy.

Previous research has determined that extrinsic cues (i.e. country of origin of a product) to form perceptions of risk and can be a risk-relieving information (Aqueveque, 2006), which, in turn, lead to form perceived value (Beneke et al., 2013). Consumer considers quality, price and performance of the product a component of risk when developing perceived value (Sweeney et al., 1999). Snoj et al (2004) have demonstrated that perceived risk is an important antecedent of perceived value. Hence, consumers form assessments about product value based on risk associated with purchasing the products (Agarwal & Teas, 2001). Hence, we find the following proposal: **H₆**: Perceived risk has a negative effect on perceived value.

Finally, prior research has shown that consumers often have difficulty in accurately identifying the origin of products (Balabanis & Diamantopoulos, 2008). Country of origin is still of significance for consumers, particularly in situations in which the consumption is associated with some form of risk (Schnettler et al., 2009), which means that country of origin, those are subject to scandals or health risks. However, a high-perceived risk would cause lower individual well-being, which could turn into anti-consumption practices (Hassan et al., 2013). The following hypothesis, thus, is: **H₇**: Perceived risk has a positive effect on country-based reluctance to buy. Hence, it is expected a high perceived value mitigate or prevent reluctance to buy foreign countries: **H₈**: Perceived value has a negative effect on country-based reluctance to buy.

Methodology

Food products have been deemed appropriate for this study. In particular, Spanish horticultural sector has been chosen as a setting for this research. This sector has suffered the effects of recurring crises (i.e., environmental, social and food crisis). These crises together with the raising of environmental consciousness and consumers' food safety concern have damaged its perceived

image. Moreover, the impact of these critical situations on public opinion is spread by mass media. Main target markets for Spanish horticultural products (Germany, France, Holland and United Kingdom) are selected as *host* countries. To accomplish such an objective, a causal cross-sectional research will be designed through a questionnaire aimed at consumers from the main destination markets of Spanish horticultural products. After a previous qualitative analysis of the scales, their psychometric properties will be ascertained by a confirmatory factorial analysis. Subsequently, a structural equation modelling will be applied using Lisrel 9.30 software, which will allow us to contrast relationships between latent constructs, as they have been raised in the conceptual model of this research.

Conclusions

From a theoretical perspective, our study contributes to international marketing literature by refining the conceptualization of the country of origin image and consumers' consumption decisions. Furthermore, we analyse product-country image and consumer affinity in a conceptual model, as well as their impact on perceived risk, perceived value and reluctance to buy foreign products. The use of a model based on the study of these variables, from the consumer's point of view, offers an innovative vision in the analysis of the horticultural sector at European level. If the results are as expected, this research will help the professionals of this sector to have a better understanding of the emotions, feelings and attitudes of final consumers about their products and production processes. As well, they will be able to develop appropriate marketing strategies that will allow companies and exporting associations to improve the product-country image and the positioning in the European markets of this sector. All this should serve as a support to strengthen and promote the Spanish identification element as a symbol of quality and efficiency in production processes, reaching a product-country image that reduces the final consumer reluctance and encourages the consumption of its horticultural products.

References

- Agarwal, S., & Teas, R. K. (2001). Perceived value: mediating role of perceived risk. *Journal of Marketing theory and Practice*, 9(4), 1-14.
- Aqueveque, C. (2006). Extrinsic cues and perceived risk: the influence of consumption situation. *Journal of Consumer Marketing*, 23(5), 237-47.
- Balabanis, G., & Diamantopoulos, A. (2008). Brand origin identification by consumers: A classification perspective. *Journal of International Marketing*, 16(1), 39-71.
- Beneke, J., Flynn, R., Greig, T., & Mukaiwa, M. (2013). The influence of perceived product quality, relative price and risk on customer value and willingness to buy: a study of private label merchandise. *Journal of Product & Brand Management*, 22(3), 218-228.
- Brijs, K., Bloemer, J., & Kasper, H. (2011). Country image discourse model: unraveling meaning, structure, & function of country images. *Journal of Business Research*, 64, 1259-1269.

- Campbell, M. C., & Goodstein, R. C. (2001). The moderating effect of perceived risk on consumers' evaluations of product incongruity: Preference for the norm. *Journal of consumer Research*, 28(3), 439-449.
- Chrysoschoidis, G., Krystallis, A., & Perreas, P. (2007). Ethnocentric beliefs and country-of-origin (COO) effect: Impact of country, product and product attributes on Greek consumers' evaluation of food products. *European Journal of Marketing*, 41(11/12), 1518-1544.
- De Nisco, A., Mainolfi, G., Marino, V., & Napolitano, M. R. (2016). Effect of economic animosity on consumer ethnocentrism and product-country images. A binational study on the perception of Germany during the Euro crisis. *European Management Journal*, 34(1), 59-68.
- Ettenson, R., & Klein, J.G. (2005). The fallout from french nuclear testing in the south pacific: A longitudinal study of consumer boycotts. *International Marketing Review*, 22(2), 199-224.
- Hassan, L., Shaw, D., Shiu, E., Walsh, G., & Parry, S. (2013). Uncertainty in ethical consumer choice: a conceptual model. *Journal of Consumer Behaviour*, 12, 182-193.
- Jaffe, E. D., & Nebenzahl, I. D. (2006). It's All in the Eyes of the Consumer. National Image and Competitive Advantage: The Theory and Practice of Place Branding, Copenhagen: Narayana Press, 79-109.
- Leonidou, L. C., Palihawadana, D., & Talias, M. A. (2007). British consumers' evaluations of US versus Chinese goods: A multi-level and multi-cue comparison. *European Journal of Marketing*, 41(7/8), 786-820.
- Oberecker, E. M., Riefler, P., & Diamantopoulos, A. (2008). The consumer affinity construct: Conceptualization, qualitative investigation, and research agenda. *Journal of International Marketing*, 16(3), 23-56.
- Oberecker, E. M., & Diamantopoulos, A. (2011). Consumers' emotional bonds with foreign countries: Does consumer affinity affect behavioral intentions? *Journal of International Marketing*, 19(2), 45-72.
- Papadopoulos, N., & Heslop, L. A. (2003). Country equity and product-country images: state-of-the-art in research and implications. *Handbook of Research in International Marketing*, 402.
- Papadopoulos, N., Elliot, S., & De Nisco, A. (2013). From 'made-in' to 'product-country images' and 'place branding': a journey through research time and space. *Mercati & Competitività*, 2, 37-57.
- Papadopoulos, N., & Heslop, L. A. (2014). *Product-country images: Impact and role in international marketing*. Routledge.
- Pappu, R., Quester, P. G., & Cooksey, R. W. (2007). Country image and consumer-based brand equity: Relationships and implications for international marketing. *Journal of International Business Studies*, 38(5), 726-45.
- Pérez-Mesa, J.C.; Giménez, J.F. & Galdeano-Gómez, E. (2016). Considering the consumer in the design of a supply chain of perishables. *IFAMA 26th Annual World Conference*. 19-23th June, Aarhus, Denmark.
- Piedra, L., Galdeano, E., & Pérez-Mesa, J.C. (2016). Is sustainability compatible with profitability? An empirical analysis on family farming activity. *Sustainability*, 8(9), 893.
- Schnettler, B., Vidal, R., Silva, R., Vallejos, L., & Sepúlveda, N. (2009). Consumer willingness to pay for beef meat in a developing country: The effect of information regarding country of

origin, price and animal handling prior to slaughter. *Food Quality and Preference*, 20(2), 156-165.

Roth, K. P., & Diamantopoulos, A. (2009). Advancing the country image concept. *Journal of Business Research*, 62(7), 726-740.

Sweeney, Julian C., Geoffrey N. Soutar, & Lester W. Johnson (1999). The Role of Perceived Risk in the Quality-Value Relationship: A Study in a Retail Environment. *Journal of Retailing*, 75(1), 77-105.

Defining Alternative Food Networks: A Systematic Literature Review

Rosario Michel-Villarreal, Martin Hingley, Ilenia Bregoli

Abstract

Purpose of the Research

Over the past two decades, extensive research effort has been directed towards examining food initiatives that “somehow” differ from the ‘traditional’ or ‘conventional’. Such newly emerging food initiatives are known as ‘Alternative food networks’ (AFNs) and have been linked to broader concepts such as locality, quality, spatiality, embeddedness, sustainability and short food supply chains (SFSC). Farmers’ markets, community-supported agriculture, box schemes, cooperatives, farm shops and other initiatives have been grouped under the AFNs umbrella. However, the literature has recognised that there is a lack of clarity with regards to the concept of AFNs (Hernández, 2009; Wilson, 2013), suggesting that it is indiscriminately used to describe systems that involve anything that the conventional does not. Thus, AFNs tend to be defined by what they are not, instead of what they actually are (Feenstra, 1997). Furthermore, the need to further examine the “alternativeness” of AFNs and the unique characteristics of such initiatives has been identified (Maye and Kirwan, 2010). Thus, the aim of this paper is to contribute towards reducing this knowledge gap through a systematic literature review on AFNs. A systematic literature review can serve as a means to advancing knowledge and facilitating theory and empirical development (Fisch and Block, 2018). In this paper, we will aim to provide some clarification of the concept of AFNs by conducting thematic analysis of the academic definitions given to AFNs in the existing literature.

Background/Motivation/Support

The emergence of AFNs has been associated with multiple economic, environmental and social changes that affect actors involved in the production and consumption sides of the conventional food system. On the production side, environmental issues, such as climate change and soil degradation, and socio-economic changes resulting from globalization, have led to a continuous increase in the vulnerability of the livelihoods of producers and farm workers (Vorley, 2002). On the consumption side, AFNs have been driven by a shift in consumer perceptions and behaviors. Such changes seem to be motivated by increased public concern over issues like ecology, health (e.g. food scares) and animal welfare (Renting, Marsden and Banks, 2003).

AFNs’ body of knowledge has grown during recent years. The term has now been popularized and associated to diverse concepts such as sustainability, food security, rural development, organic agriculture, embeddedness, urban agriculture, social innovation and many more. Two main responses to the lack of clarity and other critiques of AFNs have been identified (Wilson, 2013). On the one hand, some authors have attempted a more comprehensive qualification of what is meant by “alternative” through a characterization of different degrees or types of alternativeness. The characterization of “weaker” and “stronger” proposed by Watts, Ilbery and

Maye (2005) can be used as an example of this, where the authors categorize AFNs based on whether their alternativeness is product (weaker) or process (stronger) oriented. A second response has been to move away from the overall concept of AFNs by proposing different concepts or analytical frameworks that can better explain the complexities of food spaces (Wilson, 2013). For instance, Renting et al. (2003) proposed the concept of Short Food Supply Chains (SFSCs) as a substitute for AFNs and as a response to the need for more specific concepts.

It has been acknowledged that the alternative food movement has created new heterogeneous economic and social spaces for production and trading of food with qualifications -organic, local, specialty, fair trade- different from those of products supplied by the conventional food supply chain (Goodman, DuPuis and Goodman, 2012). However, due to the ambiguity of the concept, many diverse food initiatives have been described as “alternative”, without a clear indication of their nature and why they should be classified under the AFNs umbrella. Furthermore, many of these initiatives are uncritically deemed to be ‘good’ or ‘sustainable’ without a comprehensive analysis of how they challenge practices related to conventional food systems. This lack of clarity may limit the opportunities for constructive change that AFNs may encourage (Harris, 2009) and the overall advancement of the AFNs scholarship. Thus, the aim of this paper is to contribute to the debate of “alternativeness” by conducting a systematic review of the AFNs literature. We will endeavor to identify the different definitions given to the concept of AFNs, the types of AFNs that have been studied and the main conceptual areas that have been developed throughout the years. To this end, the research questions guiding this review are as follow: RQ1. How have AFNs been defined? RQ2. Which types of AFNs have been identified? RQ3. What are the main conceptual areas developed by the academic literature?

Methodology

To answer the questions surrounding this research study, the multidisciplinary databases Web of Science and Scopus were used to conduct searches. We used the keywords “alternative food network*”, “alternative agri-food network*” and “alternative agro-food network*”. After removing duplicates from the two databases, our initial sample consisted of 211 journal papers. Given the broad sense of the research questions we set out to explore, all papers that included the keywords within the abstract or title were pre-selected for review. For this purpose, we conducted a first screening of titles and abstracts and removed studies that were not relevant or directly related to the study of AFNs, resulting in 203 papers. A further screening of full papers resulted in a total of 186 papers to be taken forward for review. Using content analysis, we identified and extracted the following key data: year of publication, country where study took place, research methods used, characteristics of participants (in empirical studies), types and number of AFNs studied, main topics, and definitions of AFNs. For the analysis of the extracted data, both quantitative and qualitative methods of analysis were used. Firstly, we conducted statistical analysis using SPSS to determine the frequency distribution of some variables (key data). Secondly, for the analysis of definitions extracted from the literature, we used thematic analysis to identify patterns. Thematic analysis is a qualitative “method for identifying,

analysing, and reporting patterns (themes) within data” (Braun and Clarke, 2006, p.6). For this study, we adopted the six phases of thematic analysis proposed by Nowell, Norris, White and Moules (2017). Due to the ongoing nature of this research and the scope of this paper, we will only report findings related to the (qualitative) thematic analysis here.

Findings

During the first phase of the thematic analysis (Nowell et al, 2017), we became familiar with the data and established a preliminary understanding of possible patterns emerging from 31 explicit definitions of AFNs extracted from 186 papers reviewed. For instance, we identified that some of the most cited or referred to definitions of AFNs are those proposed by Feenstra (1997) and Renting et al. (2003) (table 1).

Table 1. Frequently cited definitions of AFNs

Author(s)	Definition of AFNs
Feenstra (1997)	“[...] rooted in particular places, [AFNs] aim to be economically viable for farmers and consumers, use ecologically sound production and distribution practises, and enhance social equity and democracy for all members of the community”.
Renting et al (2003)	“The term alternative food networks (AFNs) is here used as a broad embracing term to cover newly emerging networks of producers, consumers, and other actors that embody alternatives to the more standardised industrial mode of food supply [...]”

Phase two (coding) of the thematic analysis allowed us to identify initial codes across the dataset and develop a list of 36 codes. Subsequently (phase three and four), the identified codes were systematically analyzed and categorized into five different emerging themes. Lastly, in phase five, we assigned names to the overarching themes based on the main aspects of the data that they represent (table 2).

Table 2. Themes and codes of AFNs definitions

Themes	Codes
Ontology	<ul style="list-style-type: none"> • Systems and channels • Food production-consumption practices • Alternative supply model • Organized flows of food products • Hybrid networks • Spaces in the food economy • Processes that integrate new complexes of production-consumption • Set of relationships • Connections between production-consumption actors • Forms of food provisioning

Antipode	<ul style="list-style-type: none"> • Alternative to the industrialised food supply • Differ from conventional food supply systems • Contrasted with large scale, industrial agribusiness • Resistance to dominant market logic • Counter to the dominant (or conventional) • Corrective to conventional agri-food systems • Operate outside of corporate-industrial food regimes
Reconnection	<ul style="list-style-type: none"> • Reconnect producers with consumers • Re-connection between producers and consumers • Flows of product that connect people • Ways to reconnect food producers with consumers • Reconnecting consumers and producers
Proximity	<ul style="list-style-type: none"> • Potential to shortcircuit long supply chains • Closer links • Shorter distances • Rooted in places • Embedded in place • Local • Re-localisation • Direct sale
Sustainability	<ul style="list-style-type: none"> • Commitment to sustainable food production and consumption • Economically viable and use of ecologically sound production and distribution practices • Environmentally friendly/sustainable • High quality and ecologically and/or ethically superior goods • Defined by an explosion of organic, fair trade, quality and specialty goods • Organic, sustainably grown food

Theme 'Ontology' denotes efforts to explain the 'whatness' of AFNs. They have been explained in at least ten different ways, from simply 'spaces in the food economy' to complex processes of food-consumption. The 'Antipode' theme is highly prevalent and is related to the oppositional nature of AFNs in the context of traditional food systems. AFNs are said to differ, counter, resist and correct industrialized food systems. Theme 'Reconnection' is less predominant but still consistent and reflects the intention of some authors to define AFNs as initiatives aimed at reinstating the relationship between producers and consumers. Theme 'Proximity' represents another prevalent pattern that alludes to the closeness, embeddedness, shortness and/or localness of AFNs in comparison with conventional food systems. Lastly, theme 'Sustainability' refers to certain qualities of AFNs products (e.g. organic, fair trade, etc.) and the sustainable practices that are said to characterize AFNs.

Overall, AFNs seem to be defined as phenomena that are somehow oppositional to conventional food systems. However, to what extent and how they are distinct is still unclear. There are some definitions that attempt to provide a more comprehensive demarcation and suggest that AFNs are not only different from conventional food systems but are also characterized by proximity (shortness embeddedness, etc.) and sustainability. Then again, to what extent they are proximate or challenge the unsustainable practices of conventional food systems is still ambiguous.

Contributions to Theory and Practice

This paper presents findings from a thematic analysis of definitions of AFNs identified through a systematic review of 186 papers. Our analysis allowed a characterization of AFNs based on five main emerging themes from the 31 definitions reviewed. Thus, our study can be seen as a contribution towards a better understanding of the diversity of conceptual definitions of AFNs and an attempt to encourage a more consistent use of the concept. Renting et al. (2003, p.394) recognized the importance of not theoretically restricting “definitions of AFNs given the scarcity of theoretical and empirical work conducted upon them” back in 2003. Since then, a wealth of literature has emerged, and empirical evidence is now plentiful. Hence, there is an opportunity for future research studies to use this evidence base in order to critically examine the phenomena’s heterogeneity. Such effort could shed some light on the specific and shared features of AFNs and contribute to a better understanding of how these alternative forms of provisioning challenge traditional food practices.

Selected References

- Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Maye, D. and Kirwan, J. (2010). Alternative food networks. *Sociopedia.isa*.
- Feenstra, G. (1997). Local food systems and sustainable communities. *American journal of Alternative Agriculture*, 12(1), 28-36.
- Goodman, D., DuPuis, E.M. and Goodman, M.K. (2012). *Alternative food networks: Knowledge, practice, and politics*. USA and Canada: Routledge.
- Harris, E. (2009). Neoliberal subjectivities or a politics of the possible? Reading for difference in alternative food networks. *Area*, 41(1), 55-63.
- Hernández, J.L.S. (2009). Alternative food networks: Concept, typology and adaptation to the Spanish context. *Boletín de la Asociación de Geógrafos Españoles*.
- Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, 16, 1–13.
- Renting, H., Marsden, TK., and Banks, J. (2003). Understanding alternative food networks: exploring the role of short food supply chains in rural development. *Environment and Planning A*, 35, 393-411.
- Fisch, C. and Block, J. (2018). Six tips for your (systematic) literature review in business and management research. *Management Review Quarterly*, 68, 103–106.
- Vorley, B. (2002). *Sustaining Agriculture: Policy, Governance, and the future of Family-based Farming*. Birmingham, UK: International Institute for Environment and Development.
- Watts, D.C.H., Ilbery, B., and Maye, D. (2005). Making reconnections in agro-food geography: Alternative systems of food provision. *Progress in Human Geography*, 29(1), 22–40.
- Wilson, A.D. (2013). Beyond Alternative: Exploring the Potential for Autonomous Food Spaces. *ANTIPODE*.

How Does Episodic Future Interaction Affect Current Food Consumption?

Michelle S. Segovia, Marco A. Palma, and Rodolfo M. Nayga

Abstract

It is commonly believed among economists and psychologists that an individual's sense –or lack thereof – of psychological connection with his future self plays a key role in shaping his decisions today. Charles Dickens' *A Christmas Carol* serves as motivation for our work in the present paper. In the story, Ebenezer Scrooge is given a chance to redeem himself through the intervention of ghosts from his past, present and future. The visits from ghosts of the past and present make him melancholic, but cause no change in his behavior. It is not until he is visited by the Ghost of Christmas Yet-to-Come that he decides to change his present behavior. Related to this story is the notion that the degree of connectedness of an individual with his self-image and future self might affect his decision-making processes given that a future self might present challenges to his imagination. A new, but emerging literature documents the effects of evoking thoughts about the future on current consumption and decisions (for a review see Atance and O'Neill 2005). On that basis, we presented subjects with digital images representing a "healthier" and an "unhealthier" version of themselves in order to facilitate "reward/punishment" self- imagination and evaluate their self-control on an immediate task. The objectives of the present study are to 1) examine the effects of *episodic prospection* and thought inducement on current food choices, 2) analyze how food choices relate to bmi status, and 3) investigate the role of temporal discounting in the association between health-related thoughts inducement and food choices.

A total of 182 undergraduate students were recruited to participate in the experiment in exchange for a \$20 compensation fee. Participants were randomly assigned to one of three experimental conditions, where inducement of health-related thoughts was the manipulating factor: 1) *immediate effects condition*, 2) *episodic prospection condition (i.e. imagining the prospect future)*, and 3) *control condition*. Specifically, subjects in the immediate effects condition watched a 2-minute video, which induced them with thoughts related to the immediate benefits of dieting and exercising along with the immediate costs of eating unhealthy food. Subjects in the episodic prospection condition were exposed to two digitally created pictures of themselves, a weight-reduced image and a weight-increased image, and they were asked to remember their self-image representations throughout the experiment. In the control condition, subjects received no information, and simply waited 2 minutes before starting the experiment.

Following the manipulation, participants performed a food choice task and time preference task. For each choice set, subjects were asked to choose between a healthy and an unhealthy version of the same snack (e.g. original vs. light Yoplait vanilla yogurt). In order to make the task real, one out of the twenty decisions was chosen at random at the end of the session and the subject had to eat the chosen product before leaving the lab. The time preference task consisted of 15 binary choices, in each of which the subject was required to choose between

a lower immediate payment and a higher delayed payment to be received two weeks later. During the food choice task, subjects' visual attention to the food products was recorded using a non-invasive eye tracker in order to assess objective visual attention (temptation) and emotional arousal experienced by participants while performing the food choice task (i.e. pupil size).

The results show that in the control, the number of healthy choices is represented by a strictly decreasing function with respect to body mass index (BMI); that is, individuals with higher BMI make less healthy choices. After watching the health related video in the immediate effects condition, subjects with the highest BMI chose more healthy products compared to the control. This result shows that inducing subjects with thoughts about the immediate consequences of healthy and unhealthy habits encourages them to choose healthier food. Interestingly, the opposite effect was found in the episodic prospection condition, where the number of healthy choices increased only for normal and overweight subjects, but it substantially decreased for obese subjects. We argue that overweight individuals look at the goal of becoming healthier as something attainable in the short run; however, obese people might not be as stimulated or excited about looking like their future healthier selves since they perceive this goal as long-term and somewhat farfetched.

The results from a time preference task further support the findings outlined above. Obese subjects displayed higher levels of impatience in both the control and episodic prospection conditions, while the opposite effect was found for obese individuals in the immediate effects condition. Moreover, eye tracking data revealed that overweight and obese participants spent more time looking at the unhealthy snacks compared to normal weight individuals. We show how this temptation towards unhealthy snacks exhibited by the obese translated to their final food choices.

The results found here can serve as recommendations for obesity intervention programs. So far, health-related policy has focused on interventions highlighting the immediate consequences of eating habits. In this paper, we evaluate the effectiveness of programs that focus on the long-term rewards of healthy behavior, which if successful, are believed to generate a more sustainable change in future eating habits. Furthermore, by customizing programs to the individuals' specific health characteristics, programs can appeal to different priorities and goal setting. Tailoring realistic targets can keep individuals engaged and translate into better outcomes. For instance, while using education about the immediate consequences of healthy habits works well for overweight and obese individuals, we found that long-term rewards work poorly for obese subjects, who might require more tangible or plausible immediate results. This speaks to the efficacy of the "immediate effects" intervention program in achieving sustainable improvement in the healthy behavior of obese individuals.

References

Atance, Cristina M., and Daniela K. O'Neill. "The emergence of episodic future thinking in humans." *Learning and Motivation* 36, no. 2 (2005): 126-144.

Top Down, Side Up: Effects of Food Architecture on Consumption of Hedonic Foods

Nina Belei, Suresh Ramanathan, Scott Davis, Claudia Jasmand

Abstract

People tend to consume significantly more food when portion sizes are large (hereafter referred to as *portion size effect (PSE)*; Geier, Rozin, & Doros, 2006; Herman, Polivy, Pliner, & Vartanian, 2015; Wansink & van Ittersum, 2007). Previous research suggests that this is due to a mindless application of consumption norms, with large portions seeming as appropriate in serving size as small ones (Herman & Polivy, 2005; Wansink & van Ittersum, 2007). The present research aims to address two unanswered questions, namely, whether the PSE would be observed in situations where consumers are actively focusing on the taste of the food rather than simply eating it mindlessly, and whether this effect depends on how the food is presented on the plate. Given that the overconsumption of unhealthy, yet highly desirable foods (hereafter referred to as *hedonic foods*) is harmful to individuals and society, our research identifies conditions under which the PSE can be attenuated, specifically with the use of garnishes.

Many hedonic foods feature some kind of garnish. Desserts especially use garnishes to augment the visual appeal of the food. Garnishes are typically placed either on top of the food or to the side. Could the location of the garnish change consumption? The present research investigates whether the PSE, an otherwise robust phenomenon, could be affected by how a dessert is presented on the plate in the context of mindful eating when consumers focus on the taste of the dessert.

Overview

People often eat for the sake of consumption pleasure, and do so mindfully. In particular, hedonic foods such as desserts are associated with the goals of consumption pleasure and sensory stimulation (Alba & Williams, 2013; Krishna, 2012). Anticipated and experienced pleasure from eating tasty food are associated with a strong appetitive motivation (Stroebe, van Koningsbruggen, Papies, & Aarts, 2013).

High approach motivation manifests in narrowed attention to motivationally relevant objects (Gable & Harmon-Jones, 2008, 2010). Narrowed attention works similar to the selective focus of a zoom lens (Barriopedro & Botella, 1998; Eriksen & St James, 1986). Increasing the focus on the core features of the desired object diminishes focus on peripheral stimuli (Harmon-Jones & Gable, 2009). Narrowed attention caused by objects of high motivational relevance may lead to two effects, namely, increased processing of basic features such as shape, size, colors, or movement, and the conjunctive integration of features (Treisman & Gelade, 1980).

Feature integration theory (Treisman & Gelade, 1980) suggests that at the first stage of perception, basic features such as the size of an object receive attention. Size perceptions may be influenced by how relevant the object is. Various studies have established a fundamental link between people's motivation to attain desired goals and increased size perception of goal-relevant objects (Aarts, Custer, & Veltkamp, 2008; Bruner & Goodman, 1947; Bruner & Postman, 1949; van Koningsbruggen, Stroebe, & Aarts, 2011). When taste goals are salient,

people attend to objects instrumental to attaining their goal and scan their environment for potential means to reach that goal. Objects irrelevant to the goal may be excluded from further processing, whereas goal-relevant objects may receive disproportionate attention depending on their expected value, causing them to “loom larger” (Papies, Stroebe, & Aarts, 2008). In the context of taste goals, we expect hedonic foods, whether presented as the base dessert or as a garnish, to be perceived as larger compared to their normative size, leading to increased consumption.

The second stage of feature integration takes into account the contents and features of the visual field of attention. Features of an object are conjunctively integrated, a process that can affect how the object is perceived (Treisman & Gelade, 1980). A hedonic dessert with a hedonic garnish, for example, is unequivocally perceived as hedonic. However, a hedonic dessert with a healthy garnish may be seen as less hedonic due to the fact that the garnish affects the perception of the focal dessert. In contrast, a healthy dessert such as fruit salad may be seen as healthy on its own, but the addition of a hedonic garnish may make it seem tastier in the context of salient taste goals.

Findings

We conducted two experimental studies in the laboratory with real food that we presented participants under the pretext of a taste test for a new dessert being launched in town. In our first study, we invited 189 participants from a Dutch university and presented them with plates of small or large servings of chocolate cake that were garnished either with raspberries or hazelnut balls, placed either on the side of the cake or on top of it. In the second study, we had 347 participants from a large public university in the United States, who tasted small or large plates of vanilla ice-cream and berries. Half the participants consumed ice-cream with the berries used as a garnish. The other half consumed berries with the ice-cream used as a garnish. In addition, we also had two control conditions with just the base food (ice-cream or fruits) and no garnish. Garnish location was varied, either on the side or on top.

Hedonic base food. When the base food was hedonic (chocolate cake or ice-cream), exposure to large versus small portions resulted in narrowed attentional focus due to increased motivational relevance carried by the hedonic food. When there was no garnish, the narrowed focus on the hedonic base food led to increased consumption of large versus small portions (PSE).

When the garnish was on the side and not physically in touch with the large-sized hedonic food, it was relatively easy for consumers to ignore the peripheral garnish or to pay less attention to it. Accordingly, this led to an overestimation in size of the large hedonic food and increased consumption (i.e., a PSE).

In contrast, garnishes on top of the base food are visually integrated with the food and, hence, more difficult to ignore, necessitating conceptual integration (Treisman, 1990; Treisman & Gelade, 1980). When the garnish was also hedonic (hazelnut balls), and hence of similar motivational relevance as the base food, its features were conceptually similar to that of the base food and should not warrant any additional feature-based processing. However, when the garnish was healthy (raspberries), and hence of lower motivational relevance than the base food in the context of a focus on taste, it needed to be conceptually integrated, affecting the perceived

taste of the base food negatively. This led to a diminished tendency to overestimate the size of the hedonic base food and hence attenuated overconsumption.

Healthy base food. When the healthy dessert (berry fruit salad) was presented without a garnish, it was less motivationally relevant to the taste goal. As such, we did not observe an increase in either size estimations or consumption for large versus small servings.

Further, the lower motivational value of the base food is likely to lead to an increased scanning of the environment for objects that are more motivationally relevant. Hedonic garnishes present an opportunity to engage the taste goal to a higher degree compared to the healthy base food. Consequently, there was overestimation in the size of the ice-cream garnish, and it was perceived to be affecting the taste of the base food in a positive way. Thus, regardless of the location, the addition of a hedonic garnish may make a healthy dessert more motivationally relevant and lead to greater consumption of large versus small servings.

The results of these two consumption studies illustrate that the effects of portion size on consumption of foods in the context of mindful eating focused on taste are driven by what people attend to. In the case of hedonic base food with a healthy garnish, there was greater attentional narrowing caused both by the size of the food and its high motivational relevance to the goal of taste, leading to a focus on the features of what was in the visual field. This led to increased consumption when the garnish was peripheral to the food but reduced consumption when it was on top, likely due to the fact that the garnish was seen to affect the taste of the food negatively (see web appendix). In the case of healthy base food with a hedonic garnish, the garnish was more motivationally relevant than the food base itself, causing it to be included in the visual field regardless of location, thereby looming larger and biasing consumption upwards by affecting the taste of the food positively.

References available upon request.

From Disgusting To Delicious: Overcoming Barriers To Entomophagy Among Danish Consumers

Pernille N. Videbaek & Klaus G. Grunert

Abstract

Background and aim

In a Western context using insects as food is considered a novel, innovative idea. According to the marketing literature, whenever an innovation enters the market, innovators and early adopters will try the product, use it, and eventually the rest of the market will follow (Rogers, 2003). However, there seem to be a special kind of resistance to the idea of insects as food. Products with insects as ingredients are by many consumers in Western cultures not only considered an innovation within food, entomophagy is also considered to be disgusting (Cicatiello et al., 2016). This is problematic as insects are seen as a nutritious and sustainable alternative protein source, with a smaller ecological footprint than the production of other animals for human consumption (Van Huis et al., 2013).

The aim of the study is to examine the factors that influence the Danish consumers' attitudes towards eating insects, and in the process expose the barriers that most prevent them from engaging in entomophagy.

The theoretical foundation for the study is a socio-cognitive approach. From this line of thought, several constructs have been used: Attitude, social norm, and intention. The higher your intention to perform a specific behaviour, the higher the likelihood that you will actually perform it (Ajzen, 1991). Both attitude and social norm have to varying degrees been found to influence intention in previous studies (Ajzen, 1991).

As eating insects is a behaviour that can elicit very strong reactions, it is theorised that a respondent's attitude towards entomophagy will have the strongest impact on intention. The social norm is measured, but it is not expected that it will have an influence on either the attitude or the intention, as previous research has indicated that this is not the case with regards to entomophagy (Menozzi et al., 2017).

Several attributes have been shown to have an influence on consumers' attitude towards entomophagy. Studies have examined how consumers perceive insect products and have found that degree of processing (Gmuer et al., 2016), packaging and branding (Baker et al., 2016; De-Magistris et al., 2015), and information (De-Magistris et al., 2015; Hamerman, 2016; Looy & Wood, 2006; Ver-neau et al., 2016) to some extent play a role when consumers are deciding whether or not to eat products containing insects.

The concepts of food neophobia and disgust also seem to play a role. Food neophobia is the tendency for a consumer to avoid new foods or meals that they have not tried before (Baker et al., 2016). This concept has been widely measured in previous research and has been found to have a significant effect on Western consumers' willingness to eat insects (Baker et al., 2016;

Hartmann & Siegrist, 2016; Hartmann et al., 2015; Piha et al., 2017; Tan et al., 2016; Verbeke, 2015). Disgust is an emotion, typically measured by a scale developed by Olatunji and colleagues (2009). The scale measures three dimensions of disgust: core disgust, contamination disgust, and animal reminder disgust. Especially core disgust have been found to have an effect on respondents' willingness to eat insects (Hamerman, 2016; Hartmann & Siegrist, 2016). Food neophobia has as of yet been researched more than disgust and has been found to have a relatively large effect on the attitude.

Methodology

An online questionnaire was distributed to a representative sample of Danish consumers. The data was collected in the fall of 2017 and the sample size was 975 (496 women, 50.9%). Previously validated scales were used for the measures of food neophobia (Pliner & Hobden, 1992) and disgust (Olatunji et al., 2009). For the attitude measure, a newly developed scale by F. Verneau and F. La Barbera (not yet published) was used. This scale specifically measures a respondent's attitude towards eating insects. Before the attitude measure was administered in the survey the respondents were randomly assigned to one of four groups. Each group read a piece of text outlining different information about the advantages of eating insects: the first group got information on the environmental benefits of entomophagy, the second group got information on insects' nutritional value, the third group got information on the gastronomical attributes of insects, and the last group was a control group.

In order to measure intention to eat insects, a choice experiment was setup. The respondents had to choose between two meals, that had the following attributes and levels: Whole insects (crickets/mealworms/no insect), fish (fed with insects/not fed with insects), bread (with insect flour/without insect flour), and purée (with insect flour/without insect flour). In addition, intention was also measured by asking respondents to rate how likely it was on a scale from 1 to 7 that they would in-corporate a number of insect products in their current diet.

Social norm was measured using three items taken from the literature (Menozzi et al., 2017).

Whether or not the respondents had eaten insects before was measured using two items, both with a dichotomous yes/no response. The first item asked whether or not the respondent had eaten whole insects before, and the second item asked whether or not the respondent had eaten products with insects as an ingredient before. Demographics included gender, age, education level, occupation, and income level.

Findings

The attitude scale was found to have three underlying factors: Disgust, Interest, and Feed. The Attitude_disgust factor (Cronbach's alpha = 0.95) measures how disgusting the respondent finds entomophagy. The Attitude_interest factor (Cronbach's alpha = 0.86) measures how interested in eating insects the respondent is. The Attitude_feed factor (Cronbach's alpha = 0.77) measures how accepting the respondent is of using insects as feed. Based on the responses to the attitude scale, respondents were clustered (hierarchical cluster analysis, Ward's method) into three segments: The Neutrals (48.2%), Insect Opponents (23.3%), and Potential Entomophagists (28.5%). Significantly more men than women are Potential Entomophagists, and significantly

more women than men are Insect Opponents. This is consistent with previous literature (Cicatiello et al., 2016; Hamerman, 2016; Verbeke, 2015). More respondents in the Potential Entomophagist segment have tried to eat insects before, either whole or as an ingredient, than in the other two segments.

The segments with The Neutrals and Insect Opponents are significantly more neophobic and feel more core and contamination disgust than the segment with Potential Entomophagists. The Neutrals and the Insect Opponents are also more affected by the social norms regarding entomophagy than the Potential Entomophagists.

The choice experiment reveals another barrier to the consumption of insects of Danish consumers. All segments clearly prefer a meal without whole insects, even though this tendency is more pronounced for The Neutrals and the Insect Opponents, than it is for the Potential Entomophagists. Degree of processing is therefore a potential barrier, but at the same time a potential solution to the resistance to insects, as consumers prefer to eat insect products where either the insect is highly processed, for instance ground in flour, or products where insects have been used as feed, for instance farmed fish fed with insects. This is consistent with previous research, where the correlation between a higher degree of processing and a more positive attitude towards the product also have been found (Gmuer et al., 2016). This is also in line with the findings by Baker and colleagues (2016) that find that even the picture of a whole insect on the packaging of the insect product discourages consumers from buying it.

The second measure of intention reveals the same pattern – Potential Entomophagists are more likely to incorporate the products than any of the other two segments, regardless of whether insects are used as feed, as an ingredient, or as a whole. However, the answers were reported on a seven-point scale and only five out of 11 products were scored above the mid-point, many of them only scoring an average of just above four. The preferred products are clearly products where insects are used as feed or where the insects are used as ingredients. A positive attitude is therefore not enough to influence the intention to eat insects, and other forces such as the social norms are at play. 28% of respondents are classified as Potential Entomophagists, but this study indicates that their positive attitude is not strong enough to be fully carried over into intention, and we would therefore expect that less than a third of Danish consumers would be prepared to actually adopt insect products as of now002E

Danish consumers mirror the attitude of consumers in other Western societies in that they tend to find insects disgusting, and they are hesitant to incorporate them into their diet. If they were to do so, they would have to be highly processed – whole insects is not a dish to put on the menu for many consumers. Men seem more likely to eat insects than women do, as has been the case in previous studies in other Western settings. However, contrary to other studies, Danish consumers are highly influenced by social norms when it comes to insect consumption. Social norms seem to be the biggest barrier to insect consumption for Danish consumers. This is an important insight for further research, in order to find routes to making insects more appealing to the Danish consumers, and in time even making them a delicacy.

References

- Ajzen, I. (1991). The Theory of Planned Behavior, *Organizational Behavior and Human Decision Processes*, vol. 50, pp. 179-211
- Baker, M.A., Shin, J.T., Kim, Y.W. (2016). An Exploration and Investigation of Edible Insect Consumption: The Impacts of Image and Description of Risk Perceptions and Purchase Intent, *Psychology and Marketing*, vol. 33, no. 2, pp. 94-112
- Cicatiello, C., De Rosa, B., Franco, S., Lacetera, N. (2016). Consumer Approach to Insects as Food: Barriers and Potential for Consumption in Italy, *British Food Journal*, vol. 118, no. 9, pp. 2271-2286
- De-Magistris, T., Pascucci, S., Mitsopoulos, D. (2015). Paying to See a Bug on my Food: How Regulations and Information Can Hamper Radical Innovations in the European Union, *British Food Journal*, vol. 117, no. 6, pp. 1777-1792
- Gmuer, A., Guth, J.N., Hartmann, C., Siegrist, M. (2016). Effects of the Degree of Processing of Insect Ingredients in Snacks on Expected Emotional Experiences and Willingness to Eat, *Food Quality and Preference*, vol. 54, pp. 117-127
- Hamerman, E.J. (2016). Cooking and Disgust Sensitivity Influence Preference for Attending Insect-based Food Events, *Appetite*, vol. 96, pp. 319-326
- Hartmann, C., Siegrist, M. (2016). Becoming an Insectivore: Results of an Experiment, *Food Quality and Preference*, vol. 51, pp. 118-122
- Hartmann, C., Shi, J., Giusto, A., Siegrist, M. (2015). The Psychology of Eating Insects: A Cross-cultural Comparison between Germany and China, *Food Quality and Preference*, vol. 44, pp. 148-156
- Looy, H., Wood, J.R. (2006). Attitudes towards Invertebrates: Are Educational 'Bug Banquets' Effective?, *The Journal of Environmental Education*, vol. 37, no. 2, pp. 37-48
- Menozzi, D., Sogari, G., Veneziani, M., Simoni, E., Mora, C. (2017). Eating Novel Foods: An Application of the Theory of Planned Behaviour to Predict the Consumption of an Insect-based Product, *Food Quality and Preference*, vol. 59, pp. 27-34
- Olatunji, B.O., Moretz, M.W., McKay, D., Bjorklund, F., de Jong, P.J., Haidt, J., Hursti, T.J., Imada, S., Koller, S., Mancini, F., Page, A.C., Schienle, A. (2009). Confirming the Three-factor Structure of the Disgust Scale – Revised in Eight Countries, *Journal of Cross-Cultural Psychology*, vol. 40, no. 2, pp. 234-255
- Piha, S., Pohjanheimo, T., Lähteenmäki-Uutela, A., Křečková, Z., Otterbring, T. (2017). The Effects of Consumer Knowledge on the Willingness to Buy Insect Food: An Exploratory Cross-regional Study in Northern and Central Europe, *Food Quality and Preference* (2017), <http://dx.doi.org/10.1016/j.food-qual.2016.12.006>
- Pliner, P., Hobden, K. (1992). Development of a Scale to Measure the Trait of Food Neophobia in Humans, *Appetite*, vol. 19, pp. 105-120
- Rogers, E.M. (2003). *Diffusion of Innovations*, fifth edition, New York: Free Press
- Tan, H.S.G., Fischer, A.R.H., van Trijp, H.C.M., Stieger, M. (2016). Tasty but Nasty? Exploring the Role of Sensory-liking and Food Appropriateness in the Willingness to Eat Unusual Novel Foods like In-sects, *Food Quality and Preference*, vol. 48, pp. 293-302
- Van Huis, A., Van Itterbeeck, J., Klunder, H., Mertens, E., Halloran, A., Muir, G., Vantomme, P. (2013). *Edible Insects: Future prospects for food and feed security*, FAO Forestry Paper

- no. 171, Food and Agriculture Organisation of the United Nations, Rome
- Verbeke, W. (2015). Profiling Consumers Who are Ready to Adopt Insects as a Meat Substitute in a Western Society, *Food Quality and Preference*, vol. 39, pp. 147-155
- Verneau, F., La Barbera, F., Kolle, S., Amato, M., Del Giudice, T., Grunert, K. (2016). The Effects of Communication and Implicit Associations on Consuming Insects: An Experiment in Denmark and Italy, *Appetite*, vol. 106, pp. 30-36

Hue Do You Think You Are?

Exploring The Influence Of Colour On Consumer Perceptions Of Brand Personality In The Context Of Renowned Food And Beverage Brands.

Justin Beneke & Evie Remsik

Abstract

Background and Purpose of the Research

Whilst colour is a part of everyday life, marketers view it as a powerful and distinctive marketing tool that can be interlinked and weaved into advertising, branding, communications and stores (Hynes, 2009; Singh, 2006). Colour has the capability to evoke various associations, without prior conditioning, so as to communicate a brand's desired image in the consumer's mind (Madden, Hewett & Roth, 2000). Brands such as Victoria's Secret have effectively modified their corporate colour scheme to reach a specific target audience and differentiate itself from competitors (Labrecque & Milne, 2012). Colour can evoke a host of sensations and become a point of differentiation at the point of sale (Jansson, Marlow & Bristow, 2004; Tutssel, 2000). It is therefore no wonder that marketers are turning to colour consultants in an attempt to determine the most suitable colour scheme in projecting their brand traits and personality (Labrecque & Milne, 2012).

This research project sought to understand the influence of colour on consumer perceptions of brand personality by focusing on high stature food and beverage brands such as Coca-Cola, Starbucks, McDonalds and Oreo.

Methodology

The authors used an experimental design within a series of focus groups, using a combination of projective techniques and discussion to generate insights to empirically address the aforementioned research aim.

Each of the six brands (i.e. Coca-Cola, Cadbury, McDonalds, Starbucks, Oreo and Reese's) was assessed across Aaker's (1997) Brand Personality Scale using the five dimensions of Sincerity, Excitement, Competence, Sophistication and Ruggedness. Responses were measured before and after a colour change to the logo, and the findings then compared.

Findings and Contribution to Practice

The findings reinforce the notion that colour has the capability to carry information, identity and imagery that equates to symbolic value (Madden *et al.*, 2000). Although Kahney (2003, cited in Walsh, Mittal & Page, 2007) argues that brand loyalists that become attached to the visual

identity of a brand may react negatively to changes in colour, the study has revealed that this may not always be the case, especially if such changes improve upon the brand's personality in a way that greater correlates with its identity as a whole.

Subsequent to altering the colour of logos, participants revealed significant changes in brand personality between the original and the modified forms. Surprisingly, this may have positive effects. This can be seen in the case of Starbucks, in which participants preferred the colour orange over green to emphasise the “up-to-date and fresh” nature of the brand, despite its established attachment to its current colour scheme. As such, colour modification may be used to strategically update a brand's visual identity to better represent the brand personality that consumers wish to experience.

Selected References

- Aaker, J. L. (1997). Dimensions of brand personality. *Journal of Marketing Research*, 34, 347–356.
- Hynes, N. (2009). Colour and meaning in corporate logos: An empirical study. *Journal of Brand Management*, 16(8), 545-555.
- Jansson, C., Marlow, N. & Bristow, M. (2004). The influence of colour on visual search times in cluttered environments. *Journal of Marketing Communications*, 10, (3), 183-193.
- Labrecque, L. & Milne, G. (2012). Exciting red and competent blue: The importance of colour in marketing. *Journal of the Academy of Marketing Science*, 40, 711-727
- Madden, T., Hewett, K. & Roth, M. (2000). Managing images in different cultures: A cross-national study of colour meanings and preferences. *Journal of International Marketing*, 8(4), 90-107.
- Singh, S. (2006). Impact of colour on marketing. *Management Decision*, 44, (6), 783-789.
- Tuttsel, G. (2000). But can you judge a brand by its colour? *Brand Strategy*, 8-9.
- Walsh, M., Mittal, V. & Page, K. (2007). The moderating effect of brand commitment on consumer response to logo shape redesign. *Advances in Consumer Research*, 34(1), 54.

Consumers' Attitudes And Behaviours Associated With Food Waste: A Comparative Study Of Australia And Hungary

Birch, Dawn, Temesi, Agoston, Lakner, Zoltan, and Lawley, Meredith

Abstract

Globally food waste is a major concern, and in particular, the high levels of consumer food waste in developed countries with about one-third of all food produced for human consumption being lost or wasted (FAO, 2017). Food waste is comprised of "materials intended for human consumption that are subsequently discharged, lost, degraded or contaminated" (Girotti et al., 2015). Food waste involves "discarding or alternative (non- food) use of food that was fit for human consumption by choice or after the food has been left to spoil or expire as a result of negligence" (FAO 2017). Food waste is not sustainable and has numerous negative impacts including social impacts (i.e. food insecurity and poverty), economic impacts (e.g. rising food prices adding to household debt) and environmental impacts (e.g. landfill, greenhouse emissions, reduced biodiversity) (Graham-Rowe, et al., 2014). A recent systematic review of food waste concluded that food waste is a complex and multifaceted problem, with triggers evident across the entire food supply chain from primary producers to end-consumers (Canali et al., 2017).

Consumers are the biggest contributors to food waste in developed nations (FAO, 2017; Graham-Rowe, et al., 2014; Ponis et al., 2017; Stenmarck et al., 2016). Janssen et al. (2017) estimate that 50% of total food waste in Europe is generated at household level with waste being attributed more with fresh produce than frozen food. In this study, we compare consumer food waste in one central European developing economy, Hungary with a well- developed non-European country, Australia. These countries have diverse socio-economic profiles with average annual incomes in Hungary being 3,875,460 HUF in 2017 (equivalent to EUR12,460 p.a.) while average annual income in 2016 in Australia was A\$78,832 (equivalent to EUR 50,267 p.a.) (Living in Australia, 2017; Trading Economics, 2017). The proportion of weekly income spent on food in Hungary is about 16.6 percent of earnings, as compared with 10.6% in Australia (Plumer, 2015).

One-third of the 1.8 million tons of food waste in Hungary comes from households meaning that on average a Hungarian family wastes 50,000 HUF (160 EUR) of food each year

(NFC SO, 2018). A recent study of 100 Hungarian households by Szabó-Bódi et al. (2017) estimated annual food waste in Hungary to be 68 kg per capita (accounting for around 10- 11% of food purchases). A study of 2300 Australian consumers by RaboDirect (2017) revealed that Australians consumers waste around 14 percent of their weekly groceries accounting for AUD9.6 billion annually (AUD1050 per capita). Reasons for wasted food in Australia are varied and associated with apathy, laziness, high disposable incomes, consumer demand for high quality produce, poor planning, over purchasing and refusing to eat left overs, poor storage and refrigeration practices (Farr-Wharton et al., 2014; Hogan, 2017; Pearson et al., 2013). According to Szabó-Bódi (2017), the most important reasons for food waste in Hungary are unconsumed cooked meals which occur because Hungarians tend to over cater, followed by food not being stored carefully, linked with unplanned, impulse food purchases.

Food waste occurs at every stage of the food consumption cycle from planning, provisioning, transporting and storage, preparing, serving and during post-consumption (e.g. managing leftovers and disposal) (Aschemann-Witzel et al., 2015; van Geffen et al., 2016). For example, Stancu et al. (2016) identified that while for Danish consumers shopping and use of leftovers were the most critical drivers of food waste, planning routines also contributed indirectly to food waste. Ponis et al. (2017) found that household behaviours towards shopping are an important food waste determinant in Greece. Likewise, Richter and Bokelmann (2017) found relationships between food purchase, storage and waste among German consumers and argued that interventions to address food waste should focus on these three issues together. Given that despite being a well-developed country, around 3.6 million Australians were impacted by food insecurity in 2016-2017, and the Hungarian Charity Service of the Order of Malta estimates that in 2018, 30 -50,000 Hungarian children are starving every day, consumers in both developed and developing countries need to be better informed about how to effectively reduce food waste (Nakos, 2017; Sain, 2018). Reduction in food waste yields significant benefits including social (e.g. reduced food insecurity), environmental (e.g. reduced use of scarce water and land resources), and economic (e.g. reduced expenditure and costs of managing landfill) benefits (Rabodirect, 2017).

The research reported in this paper is based on a current revision of food-related lifestyle (FRLi) instrument, the modular food-related lifestyle instrument (MFRLi) which is designed to develop a more parsimonious instrument and capture recent issues related to food including food waste. The FRLi was first designed by Bredahl and Grunert (1997) and has been used extensively by researchers and proven to provide stable results and cross-cultural segments (uninvolved, conservative, careless, rational, and adventurous food segments). The MFRLi comprises three core dimensions (involvement with food, innovation with food and responsibility with food) and then numerous modules associated with aspects of the food consumption

Table 1: Food Waste Statements

Statement	TOTAL Mean (SD)	HUN Mean (SD)	AUS Mean (SD)
<i>Overall attitude toward food waste</i>			
It is very important for me not to waste food in my household.	5.67 (1.37)	5.88 (1.37)	5.47 (1.34)
I actively try to avoid food waste by buying less, cooking less and/or serving less.	4.99 (1.53)	5.12 (1.57)	4.86 (1.47)
When planning a meal, I try to use up what is in the cupboard or fridge rather than buying new ingredients.	5.46 (1.43)	5.12 (1.53)	5.20 (1.35)
<i>Planning</i>			
Before I go shopping for food, I make a list of everything I need.	4.74 (1.76)	3.46 (1.79)	4.93 (1.72)
What I am going to have for my main meal is very often a last minute decision	4.28 (1.75)	4.48 (1.84)	4.07 (1.63)
I often purchase food I had not planned to purchase at the store.	4.50 (1.59)	4.11 (1.65)	4.88 (1.43)
<i>Provisioning and use of use by dates</i>			
I nearly always check use by dates when selecting food items at the store.	5.16 (1.69)	5.06 (1.85)	5.26 (1.59)
I check use by dates at home to determine which foods to use up first	5.12 (1.61)	5.03 (1.79)	5.23 (1.41)
I usually check the packed on and use by dates to ensure that I am buying the freshest produce	5.08 (1.61)	4.96 (1.73)	5.20 (1.45)
I don't take much notice of use by dates, I trust my senses	3.56 (1.92)	3.70 (2.04)	3.42 (1.75)
<i>Transporting and Storing</i>			

I don't know much about how to transport and store fresh food properly	3.04 (1.80)	2.81 (1.33)	3.28 (1.74)
I make a concerted effort to transport and store food at the correct temperature.	5.22 (1.51)	5.54 (1.40)	4.99 (1.55)
I nearly always use a cooler bag or box for transporting frozen or chilled foods home from the store.	3.58 (2.00)	3.07 (1.94)	4.08 (1.94)
I store the oldest food closest to the front of the cupboard or fridge so I remember to use it first.	4.78 (1.77)	4.73 (1.75)	4.77 (1.79)
<i>Post-consumption: Managing left-overs</i>			
I usually keep leftover food in the fridge to serve another day.	5.66 (1.40)	5.94 (1.37)	5.39 (1.37)
I often freeze leftover food to avoid food waste.	4.99 (1.82)	5.19 (1.88)	4.87 (1.75)
I mostly use leftover food that I don't want to eat wisely such as composting or feeding it to my pets.	4.53 (1.98)	4.63 (2.10)	4.44 (1.85)
<i>Post-consumption: Disposal</i>			
I often end up throwing food away.	3.42 (1.76)	3.13 (1.75)	3.71 (1.72)
I always dispose of fresh food if it has passed its use by date.	4.49 (1.74)	4.42 (1.89)	4.55 (1.57)
I always dispose of canned or frozen food if it has passed its use by date.	4.51 (1.83)	4.35 (1.92)	4.63 (1.72)
I will only serve food that I know is fresh.	5.43 (1.42)	5.85 (1.42)	5.12 (1.32)

(Scale: 1 = Strongly disagree to 7 = Strongly agree)

Overall, consumers in both samples reported good intentions with respect to food waste; however, these good intentions may not always materialise into practice. The majority of respondents (82%) agreed that it is very important for them not to waste food in their household. However, less than two-thirds (63.7%) of the respondents agreed that they actively try to avoid food waste by buying less, cooking less and/or serving less. As hypothesised, Hungarian consumers are more concerned with food waste, being more likely to agree that is important for them not to waste food ($t = 4.72$, $p = 0.00$) and more actively trying to avoid food waste by buying less, cooking less and serving less ($t = 2.71$, $p = 0.01$).

Planning and Provisioning: Food waste is associated with poor planning and provisioning. While 70.2% of the respondents try to use of what is in the cupboard or fridge rather than buying new ingredients when planning a meal, only 59.9% make a list of everything they need before going shopping for food. Moreover, 48.6% agreed that what they are going to have for their main meal is very often a last minute decision, with 54.3% often purchasing food they had not planned to purchase at the store, indicating many consumers may be susceptible to store promotions and impulse buying. In support of our hypothesis, Hungarian consumers were less likely to agree that they purchase food they had not planned to purchase at the store ($t = -7.91$, $p = 0.00$). However, contrary to our hypothesis, Hungarian consumers reported it was more likely that what they were going to eat for their main meal would be a last minute decision ($t = 3.71$, $p = 0.00$) and they are less likely than the Australian consumers to make a shopping list before shopping for food ($t = -3.53$, $p = 0.00$). Use by dates, and in particular, best before dates have been criticised as being too conservative, and as consumers rely on these to evaluate the freshness of food and fitness for consumption they potentially both prevent and lead to food waste. In keeping with previous

research (Neff et al., 2015), 71.2% of the respondents check use by dates at home to determine which foods to use up first. However, about one-third of consumers (34.6%) and Hungarian consumers more so than Australian consumers ($t = 2.34$, $p = 0.02$) agreed that they trust their senses rather than taking much notice of use by dates. Most consumers (71.1%), and Australian consumers more so than Hungarian consumers ($t = -2.01$, $p = 0.5$), rely on use by dates at the store to select items. About two-thirds (68.7%) of consumers and, once again, Australian consumers more so than Hungarian consumers ($t = -2.42$, $p = 0.02$) use these dates as a means of ensuring they are buying the freshest produce. While this heightened attention to use by dates may mean that Australian consumers are purchasing fresher food, leading to less consumer food waste at home, it may also potentially be leading to higher supply chain food waste as Australian consumers reject perfectly edible stock which is close to its use by date (Hebrok & Boks, 2017).

Transporting and Storage: Incorrect transportation or storage of food leads to food waste and in particular in countries with warmer climates such as Australia (Farr-Wharton et al., 2014). About one-quarter of the respondents (23.7%) and Australian consumers in particular ($t = -4.42$, $p = 0.00$) agreed that they don't know much about how to transport and store fresh food properly. While 70.4% of respondents, and Hungarian consumers more so than Australian consumers ($t = 6.83$, $p = 0.00$), agreed that they make a concerted effort to transport and store food at the correct temperature, only 36.2% of respondents, and Hungarian consumers much less so than Australian consumers ($t = -8.25$, $p = 0.00$), use a cooler bag or box for transporting frozen or chilled foods home from the store. Moreover, only 61.5% of respondents store the oldest food closest to the front of the cupboard or fridge so they remember to use it first. Hence, consumers need better education and information about how to effectively transport food, in particular in warmer climates, as well as strategies for storing food at the correct temperature and ensuring oldest food is consumed first.

Post-consumption: Food waste can also arise due to poor management of left-overs, typically resulting from over catering. In line with previous research (Mavrakis, 2014), the majority of respondents (83.7%), and Hungarian consumers more so than Australian consumers ($t = 6.40$, $p = 0.00$), usually keep left-over food in the fridge to serve another day. Indeed, a previous study of Australian consumers indicated that meal planning is based on what people feel like eating rather than what is in the fridge (Baker et al., 2009). About two-thirds of consumers (66.1%), and Hungarian consumers more so than Australian consumers ($t = 1.99$, $p = 0.05$), freeze left-over food to avoid food waste. Over half of the respondents (56.8%) mostly use left-over food that they don't want to eat wisely, such as composting it or feeding it to their pets. However, 31% of respondents confess, and Australian consumers in particular ($t = -5.32$, $p = 0.00$), that they often end up throwing food away. Our findings lend support to our hypothesis that Hungarian consumers tend to be more diligent when it comes to managing food waste than Australian consumers. For food safety reasons, consumers are advised not to consume food which has passed its use by date. However, to reduce food waste, consumers need to be more educated about the advisory role of best before as opposed to use by dates. Moreover, consumers should be encouraged for less risky food categories such as canned and frozen produce to rely more upon their senses (Hebrok & Boks, 2017). While producers and retailers have a duty of care to consumers regarding product safety, they may need to revisit both due dates and best before date

to ensure they are not overly conservative (Wansink & Wright, 2006) and manage shelf stocking more responsibly to allow old stock to clear first (Hebrok & Boks, 2017). Overly conservative food management may inadvertently lead to food waste with half of the respondents (52.5%), and Australian consumers in particular ($t = -2.17$, $p = 0.03$), always disposing of canned or frozen food once it has passed its use by date. Likewise, 51.3% of the respondents always dispose of fresh food once it has passed its due date, despite, 75.7% of the respondents agreeing that they will only serve food that they know is fresh. Despite Hungarian consumers agreeing more strongly that they will only serve food if they know it is fresh ($t = 8.46$, $p = 0.00$), they are no more likely to dispose of fresh food which has passed its due date. Hence, in line with educating consumers about due dates, addressing food waste depends upon realigning consumer expectations around freshness.

Limitations and further research: This paper is limited to a comparison of Australian and Hungarian consumers and thus further research could focus on other cross-cultural differences in food waste management across different levels of economic development. The different data collection methods used for the two samples needs to be considered when interpreting the results, as social desirability bias may be more likely to occur with personal interviews as opposed to self-completion online. Further research is needed to understand actual behaviours, underlying values and social and personal norms that lead to food waste. In-depth qualitative enquiry such as interviews or ethnographic studies based on consumer waste diaries and observation may be useful to gaining richer insights and understanding the trade-offs that may occur when dealing with food waste (Hebrok & Boks, 2017). For example, while consumers may feel guilty and express concern about food waste (Brook Lyndhurst 2007), they may also feel the need to have a well-stocked fridge or pantry and to be generous with portions and catering (Mavrakis 2014), reflected in the identified need to be a “good provider” (Graham-Rowe et al., 2014) or a “good mother” (Porpino et al., 2015) (Hebrok & Boks, 2017). Moreover, in the face of abundant availability of relatively cheap food and relatively high levels of income in developed countries such as Australia, lifestyle factors, routines and a desire for convenience may mean that intentions around reducing food waste do not materialise into changed behaviours (Jackson & Viehoff, 2016; Evans, 2014). Finally, based on this understanding, a range of intervention strategies that interrupt routine behaviour associated with food waste across the food consumption cycle and reflect the complexity of the problem, need to be designed and tested (Hebrok & Boks, 2017).

References

- Aschemann-Witzel, J., de Hooze, I., Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-related food waste: Causes and potential for action. *Sustainability*, 7(6), 6457-6477.
- Baker, D., Fear, J., & Denniss, R. (2009). What a waste: an analysis of household expenditure on food. The Australian Institute. Policy Brief, 6.
- Birch, D., Brunso, K., Grunert, K., & Memery, J. (2017). Modular food-related lifestyle: A new instrument for consumer segmentation in food marketing. Paper presented at International Food Marketing Research Symposium, Dubrovnik, Croatia. 15-16 June

2017.

- Bredahl, L., & Grunert, K. G. (1997). Food-related lifestyle trends in Germany 1993-1996. MAPP working paper no. 50. Aarhus: Aarhus School of Business.
- Brook Lyndhurst, B. (2007). WRAP Food Behaviour Consumer Research - Findings from the Qualitative Phase. London: WRAP.
- Canali, M., Amani, P., Aramyan, L., Gheoldus, M., Moates, G., Östergren, K., Silvennoinen, K., Waldron, K., & Vittuari, M. (2017). Food Waste Drivers in Europe, from Identification to Possible Interventions. *Sustainability*, 9(37); doi:10.3390/su9010037
- Evans, D. (2014). *Food Waste. Home Consumption, Material Culture and Everyday Life*. London: Bloomsbury.
- FAO. (2017). Food Loss and Waste. Available from <http://www.fao.org/food-loss-and-food-waste/en/>, accessed 19 November 2017.
- Farr-Wharton, G., Foth, M., & Choi, J. H. (2014). Identifying factors that promote consumer behaviours causing expired domestic food waste. *Journal of Consumer Behaviour*, 13(6), 393-402. doi: 10.1002/cb.1488.
- Giroto, F., Alibardi, L., & Cossu, R. (2015). Food waste generation and industrial uses: A review. *Waste Management* 45, 32–41.
- Graham-Rowe, E., Jessop, D., & Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. *Resources, Conservation and Recycling*, 84, 15-23, doi: 10.1016/j.resconrec.2013.12.005
- Hebrok, M., & Boks, C. (2017). Household food waste: Drivers and potential intervention points for design: An extensive review. *Journal of Cleaner Production*, 151, 380-392.
- Hogan, A. (2017). Australia's top 5 wasted food ingredients. *Australian Food News*. Available from <http://www.ausfoodnews.com.au/2017/07/24/australias-top-5-wasted-food-ingredients.html>, accessed 19 November 2017.
- Jackson, P., & Viehoff, V. (2016). Reframing convenience food. *Appetite* 9, 1-11.
- Janssen, A., Nijenhuis-de Vries, M., Boer, E., & Kremer, S. (2017). Fresh, frozen, or ambient food equivalents and their impact on food waste generation in Dutch households. *Waste Management*, 67, 298–307.
- Living in Australia. 2017. Average Salary Australia. Available from <https://www.livingin-australia.com/salaries-australia>, Accessed 12 February 2018.
- Mavrakis, V. (2014). *The Generative Mechanisms of Food Waste in South Australian Household Settings*. PhD thesis. Flinders University, Faculty of Health Sciences, Department of Public Health.
- Nakos, N. (2017). Food waste in Australia totals nearly \$10 billion each year. Rabodirect Report. *Australian Food News*. Available from <http://www.ausfoodnews.com.au/2017/10/30/food-waste-in-australia-totals-nearly-10-billion-each-year-rabodirect-report.html>, accessed 10 November 2017.
- NFCISO: National Food Chain Safety Office. Available from <http://abouthungary.hu/national-food-chain-safety-office>, accessed 6 February 2018.
- Neff R., Spiker M., & Truant, P. (2015). Wasted Food: U.S. Consumers' Reported Awareness, Attitudes, and Behaviors. *PLOS ONE* 10(6): e0127881. <https://doi.org/10.1371/journal.pone.0127881>

- Pearson, D., Minehan, M., & Wakefield-Rann, R. (2013). Food waste in Australian households: Why does it occur? *The Australasian-Pacific Journal of Regional Food Studies*, 3, 118-132.
- Plumer, B. (2015). Map: Here's how much each country spends on food. Vox. Available From http://cdn0.vox-cdn.com/assets/4715062/food_expenditures_and_malnutrition.png, Accessed 12 February 2018.
- Ponis, S., Papanikolaou, P., Katimertzoglou, P., Ntalla, A., & Xenos, K. (2017). Household food waste in Greece: A questionnaire survey. *Journal of Cleaner Production*, 149, 1268 - 1277.
- Porpino, G., Parente, J., & Wansink, B. (2015). Food waste paradox: antecedents of food disposal in low income households. *International Journal of Consumer Studies*. 39(6), 619 - 629.
- RaboDirect (2017). What a waste: \$10 billion binned every year. Available from [https://www.rabodirect.com.au/media-releases/what-a-waste-\\$10-billion-binned-every-year/](https://www.rabodirect.com.au/media-releases/what-a-waste-$10-billion-binned-every-year/), accessed 19 November 2017.
- Richter, B., & Bokelmann, W. (2017). Explorative study about the analysis of storing, purchasing and wasting food by using household diaries. *Resources, Conservation & Recycling*, 125, 181–187.
- Sain, A. (2018). The frightening reality of poverty in Hungary. *Daily News Hungary*. January 8 2018. Available from <https://dailynewshungary.com/the-frightening-reality-of-poverty-in-hungary/>, accessed 12 February 2018.
- Stancu, V., Haugaard, P., & Laahtenmaki, L. (2016). Determinants of consumer food waste behaviour: Two routes to food waste. *Appetite*, 96, 7-17.
- Stenmarck, Å., Jensen, C., Quested, T., & Moates, G. (2016). Estimates of European food waste levels. Commissioned by the European Commission in the FUSION project.
- Szabó-Bódi B. (2017). The role of food waste on environmental impact. Doctoral (PhD) manuscript. Szent István University, Faculty of Food Science, Budapest, Hungary.
- Szabó-Bódi B., Szakos D., Kasza Gy. (2017). Assessment of Household Food Waste in Hungary. *British Food Journal*, 120(3). Available from <http://www.emeraldinsight.com/doi/abs/10.1108/BFJ-04-2017-0255>.
- Trading Economics. (2017). Hungary Gross Average Wages. Available From <https://tradingeconomics.com/hungary/wages>, accessed 12 February 2018.
- van Geffen, L., van Herpern, E., & van Trijp, J. (2016). Causes and Determinants of Food Waste: A theoretical framework. Refresh. Available from <http://eu-refresh.org>, Accessed 12 February 2018.
- Wansink, B., & Wright, O. (2006). “Best if used by...” how freshness dating influences food acceptance. *Journal of Food Science*, 71(4), 354 - 357.

Motivation, Responsibility, Thriftiness and Frugality? Exploration of Food Waste Reflections among Deal Prone Danish Consumers

Louise Randers, Susanne Pedersen, Birger Boutrup Jensen, George Tsalis & Jessica Aschemann-Witzel

Abstract

Purpose of the Research

In the current paper, we explore whether and how Danish consumers reflect on their price-oriented food purchase behavior and their motivation for food handling leading to or reducing food waste and perceptions of responsibilities for food waste. We aim to shed light on how consumers perceive food waste primarily through in-depth interviews. Specifically, respondents are asked about motivations to be thrifty and/or frugal and about the responsibility of food marketers in order to develop recommendations for responsible food marketing.

Background

In the past years there has been an increasing societal focus on the issue of food waste (Bloom, 2010; Stuart, 2009). Food waste has been acknowledged as a problem with both environmental and social implications: waste of food is perceived as unethical in the light of malnutrition, hunger and rising prices of staple foods in poorer countries (Gjerres & Gaiani, 2013), and it is causing additional pressure on natural resources and emissions (FAO, 2013; Foley et al., 2011). Food waste is commonly defined as any food that could have been used for human consumption, commonly extended to include food loss early in the supply chain as well as food waste in the later, downstream part of the supply chain (Fusions, 2015). Some authors also subsume animal feed (which is in competition with human food, for example soy beans) as food waste, or even extend food waste to include overeating (e.g. Parfitt, Barthel, & Macnaughton, 2010).

Food waste is difficult to estimate and methodologies and data vary greatly (Bellemare, Çakir, Peterson, Novak, & Rudi, 2017; Bräutigam, Jörissen, & Priefer, 2014). Nevertheless, it is established that food waste originating from consumer households takes up a major share of the overall food waste (EC, 2010). This is particularly the case in affluent consumer societies (Xue et al., 2017). Thus, research has extensively studied factors causing consumer-level food waste. Studies find that a complex interrelation of factors leads to food being wasted (Hebrok & Boks, 2017; Quested, Marsh, Stunell, & Parry, 2013). For example, consumers need to be motivated to avoid food waste and for this to happen, awareness of the problem and concern about the consequences are required. Often, consumers lack capabilities in management, handling and cooking, which are skills that can reduce wastage. Also, some consumers prioritize other food-related goals such as safety, convenience and enjoyment over the goal of avoiding food waste (Aschemann-Witzel, Hooge, Almli & Oostindjer, 2018). In addition, the consumer's social relations, the purchase context, and the macro-environmental setting also play a role (Aschemann-Witzel, Hooge, Amani, Bech-Larsen, & Oostindjer, 2015).

Food marketing and the actions of food market stakeholders have been heavily criticized for heightening consumer-related food waste, both before and after purchase. For example, the overly focus on ‘perfect’ or homogenous food appearance is said to increase the wastage of fruit and vegetable deviating in shape in the supply chain, because retailers do not expect that consumers will select such food (Loebnitz, Schuitema, & Grunert, 2015). Particularly in the spotlight, however, are pricing strategies triggering greater quantities of food purchase which might be wasted in the home, such as price gradients favoring larger packages or price promotion offering multiple items, as in ‘buy one get one free’ (WRAP, 2011). It is unclear, however, if the effect of pricing on consumer’s waste behavior is as direct as suggested. First, there are various stages between purchase and disposal, for example food handling and preparation, which might interfere with the relationship between price and food waste. Second, consumers varying attitudes, capabilities and behaviors might affect the relation between price and food waste. Third, consumers with differing lifestyles might as well react rather differently to pricing of food, and subsequently in whether or not food is wasted.

So far, few studies have looked into how food pricing practices and consumer food waste are related, and they provide a mixed and complex picture. Interestingly, some findings point out that those consumers particularly seeking out price promotions at the same time are those wasting less food (Koivupuro et al., 2012). An explanation underlying this observation could be the role of consumer’s attitudes and behaviors in relation to thriftiness and/or frugality of food. Research on frugality has conceptualized this consumer characteristic as a consumer trait of “careful use of resources and avoidance of waste” (Lastovicka, Bettencourt, Hughner, & Kuntze, 1999, p. 87). In addition, some make a distinction between frugality as ‘buying only what is needed’ and thriftiness as being ‘tight of and careful with money’ (Gatersleben, Murtagh, Cherry, & Watkins, 2017). The actual measurements suggested by some researchers contain statements on behavior with regard to price promotions (Goldsmith, Reinecke Flynn, & Clark, 2014), very similar to what consumer price behavior research uses for measuring ‘deal proneness’ (the tendency to seek promotions in purchase) (Krishna, Currim, & Shoemaker, 1991; Wakefield & Inman, 1993). Thus, it seems as if a close connection between thrifty and/or frugal behavior is assumed. It could manifest itself in both food purchase, food handling and food disposal behavior. However, how this might be connected in the consumer’s own accounts and views is under-researched.

Methodology

Circa 200 households, who took part in a waste sorting study conducted by the Ministry of Environment and Food in Denmark, were contacted with regard to whether they would also be willing to participate in a follow-up waste sorting and survey study of Aarhus University. This follow-up study consisted of a food waste sorting at two points in time in November and early December 2017 to uncover the amount of food waste per each of a total of seven predefined food categories, as well as in half- or unopened packages. All participating households received a monetary incentive in the form of a gift card in order to grant access to their household waste data. In addition, the study included a survey with the same households including self-report of food purchase and food waste behavior and relevant psychographic (e.g. deal proneness,

frugality) and sociodemographic variables. A majority of households also provided their actual grocery purchase receipts during the 3-week period of study and received a separate gift card. The study was undertaken in a community of individual houses in the Central Region of Denmark. Depending on which variables are included, the final study was based on a sample of 76-103 households.

For the qualitative study presented here, the survey answers of the participants were analyzed with regard to their level of deal-proneness (Krishna et al., 1991; Wakefield & Inman, 1993), and consumers who scored above average in deal-proneness were selected as potential interviewees. Then, the waste sorting study data from the Ministry of Environment and Food in Denmark was analyzed to identify households with either high or low levels of food waste found in their household waste. Among the deal-prone consumers, participants were purposively sampled with high and low levels of food waste and with different gender, age and household composition. A semi-structured interview guide was developed. It focused on questions about the household's purchase behavior for food, habits with regard to seeking price promotions before and during food purchases as well as the motivation to choose price-reduced food sold with stickers communicating food waste avoidance (as they are common in Danish retail, see Kulikovskaja & Aschemann-Witzel, 2017). Furthermore, questions on how suboptimal food (Hooze et al., 2017) is dealt with at home were asked and behavior, attitudes and underlying motivations with regard to food waste avoidance were asked. Finally, interviews explored perceived responsibility for food waste. Qualitative studies with households analyzing food waste have been done several times before (Cappellini & Parsons, 2012; Evans, 2012; Graham-Rowe, Jessop, & Sparks, 2014; Soma, 2017), but not with a focus on the relation between price, food handling and food waste. Interviews were conducted in spring 2018. Ten households took part in the study (see Table 1 in the appendix for a characterization of the interviewed persons and households). The interviews lasted between 45 and 90 minutes, and all interviews were recorded and transcribed verbatim by one person, while a second person double-checked the transcripts. Analysis of the data will be done by three independent coders, using grounded theory and a theory-oriented approach (Greene, 1993). The analysis will explore the role of consumers motivations, perceptions of responsibility and the conceptualization of 'thriftiness/frugality' in consumer's accounts. Data triangulation will be used in that we compare the respondent's accounts with the survey and waste sorting (Creswell, 2008). Analysis of the data is ongoing. Thus, more refined results as well as a discussion and conclusions will be available by the conference. Here, we present the initial analysis of the data and examples of quotes to provide an exploration of the first emerging findings.

Findings

In this section, preliminary findings of the first five interviews are presented.

WP112: She is the one in charge of buying, cooking and administering food at home. She is not a bargain hunter and only buy price-reduced foods if she needs them. "So, in that way for me, there is simply a difference between an offer and fighting food waste. To me these are two different things" (WP112, l. 182-183). She has clear strategies for reducing food waste by not buying more food than they are using at home, planning meals for a week and putting left overs

in the freezer for later. “It is to guard also the environment, guarding not just throwing everything out. I like that” (WP112, l. 186-188). WP22: The respondent and her husband keep an eye on offerings and are buying things on sale, since they like to stock up on products they use regularly such as coffee and pork meat. However, they are also buying things that are not on sale if they need the items. They explain their attention to offers by their upbringing of limited means and a mutual agreement on priorities after 42 years of marriage. They agree on not throwing away any food and explain: “If we are throwing away bread, it goes to the birds” (WP22, l. 281-282). They also remember how their kids did not like if leftovers were on the menu. She explained: “It is more the word, really [left overs]. There is no need to throw them away, you can easily make something nice out of them” (WP22, l. 309-312). WP 111: She is very attentive to the routines in her near-by supermarket, since she knows when new products arrive and when older products are price-reduced. When products, such as meat or cold cuts, are price-reduced, she buys more and puts them in the freezer. She thinks that food prices “in general are too high, and many of the things we buy, we would not buy, if we had to pay the full price” (WP111, l. 154-160). For her, food products have to show clear signs of being too old (bad smell or looks), before she throws them out. WP161: The respondent and her husband have been raised to eat up and not throwing things out, and they have tried to raise their children in the same way. They do not like offers including many items such as 3 for 10: “Well, but if you have to buy 3 cucumbers to get them for 10 DKK and you know, well, you might only use one and a half or two, and the third has to be thrown out. I think this is so silly” (l. 237-238). They believe consumers have the main responsibility for reducing food waste, since consumers are demanding low prices and a large supply. WP32: The respondent and his wife think about reducing food waste by not buying too much and by making dinner for two nights, so they do not have to buy ingredients for too many dinners during a week. They do not buy price-reduced food close to expiration date since they prefer fresh foods. They might buy a new bread and cut it in small pieces for the freezer. When asked about not choosing price-reduced foods, he said: “It can also sometimes be, well, maybe a little about pride. If you are at the shop, you don’t want people passing by, while you are standing there rummaging in some old food” (WP32, 411-413).

Contributions to Theory and Practice

We expect to derive conclusions on how food prices and the search for price deals can be related to or impact how consumers handle food, and how consumers see themselves acting towards aligning thriftiness and/or frugality with both price promotions and food waste avoidance. This can allow developing potential implications of how retailers might support avoidance of consumer household food waste in the way they offer or frame food price promotions, or public campaigns can suggest consumers to tackle food waste avoidance in their home.

Selected References

- Aschemann-Witzel, J., Hooge, I. de, Almlí, V.L. & Oostindjer, M. (2018). Fine-Tuning the Fight Against Food Waste. *Journal of Macromarketing*. 38(2). 168-184.
<https://doi.org/10.1177/0276146718763251>
- Aschemann-Witzel, J., Hooge, I. de, Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-Related Food Waste: Causes and Potential for Action. *Sustainability*, 7(6),

- 6457–6477. <https://doi.org/10.3390/su7066457>
- Bellemare, M. F., Çakir, M., Peterson, H. H., Novak, L., & Rudi, J. (2017). On the Measurement of Food Waste. *American Journal of Agricultural Economics*. Advance online publication. <https://doi.org/10.1093/ajae/aax034>
- Bloom, J. (2010). *American Wasteland - How America Throws Away Nearly Half of Its Food (And What We Can Do About It)*: Perseus Books Group.
- Bräutigam, K.-R., Jörisen, J., & Priefer, C. (2014). The extent of food waste generation across EU-27: different calculation methods and the reliability of their results. *Waste management & research : the journal of the International Solid Wastes and Public Cleansing Association, ISWA*, 32(8), 683–694. <https://doi.org/10.1177/0734242X14545374>
- Cappellini, B., & Parsons, E. (2012). Practising Thrift at Dinnertime: Mealtime Leftovers, Sacrifice and Family Membership. *The Sociological Review*, 60(2_suppl), 121–134. <https://doi.org/10.1111/1467-954X.12041>
- Creswell, J. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches*(3.th ed.). Los Angeles:: SAGE Publications Ltd.
- EC. (2010). *Preparatory study on food waste across EU 27: Technical Report - 2010 - 054* (No. ISBN : 978-92-79-22138-5).
- Evans, D. (2012). Beyond the Throwaway Society: Ordinary Domestic Practice and a Sociological Approach to Household Food Waste. *Sociology*, 46(1), 41–56. <https://doi.org/10.1177/0038038511416150>
- FAO. (2013). Food wastage footprint: Impacts on natural resources - Summary report. Retrieved from <http://www.fao.org/docrep/018/i3347e/i3347e.pdf>
- Foley, J. A., Ramankutty, N., Brauman, K. A., Cassidy, E. S., Gerber, J. S., Johnston, M., . . . Zaks, D. P. M. (2011). Solutions for a cultivated planet. *Nature*, 478(7369), 337–342.
- Fusions. (2015). *FUSIONS Definitional Framework for Food Waste: Full report* (No. ISBN 978-91-7290-331-9). Fusions research project. Retrieved from www.eu-fusions.org/
- Gatersleben, B., Murtagh, N., Cherry, M., & Watkins, M. (2017). Moral, Wasteful, Frugal, or Thrifty? Identifying Consumer Identities to Understand and Manage Pro-Environmental Behavior. *Environment and Behavior*, 001391651773378. <https://doi.org/10.1177/0013916517733782>
- Gjerres, M., & Gaiani, S. (2013). Household food waste in Nordic countries: Estimations and ethical implications. *Etik i praksis. Nordic Journal of Applied Ethics*, 7(1), 6–23.
- Goldsmith, R. E., Reinecke Flynn, L., & Clark, R. A. (2014). The etiology of the frugal consumer. *Journal of Retailing and Consumer Services*, 21(2), 175–184. <https://doi.org/10.1016/j.jretconser.2013.11.005>
- Graham-Rowe, E., Jessop, D. C., & Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. *Resources, Conservation and Recycling*, 84, 15–23. <https://doi.org/10.1016/j.resconrec.2013.12.005>
- Greene, J. C. (1993). The role of theory in qualitative program evaluation. In D. Flinders & G. E. Mills (Eds.), *Theory and Concepts in Qualitative Research: Perspectives from the Field* (pp. 24–45). New York: Teachers College Press.

- Hebrok, M., & Boks, C. (2017). Household food waste: Drivers and potential intervention points for design – An extensive review. *Journal of Cleaner Production*, 151, 380–392. <https://doi.org/10.1016/j.jclepro.2017.03.069>
- Hooge, I. E. de, Oostindjer, M., Aschemann-Witzel, J., Normann, A., Loose, S. M., & Almlí, V. L. (2017). This apple is too ugly for me! *Food Quality and Preference*, 56, 80–92. <https://doi.org/10.1016/j.foodqual.2016.09.012>
- Koivupuro, H.-K., Hartikainen, H., Silvennoinen, K., Katajajuuri, J.-M., Heikintalo, N., Reinikainen, A., & Jalkanen, L. (2012). Influence of socio-demographical, behavioural and attitudinal factors on the amount of avoidable food waste generated in Finnish households. *International Journal of Consumer Studies*, 36(2), 183–191. <https://doi.org/10.1111/j.1470-6431.2011.01080.x>
- Krishna, A., Currim, I. S., & Shoemaker, R. W. (1991). Consumer Perceptions of Promotional Activity. *Journal of Marketing*, 55(2), 4–16.
- Kulikovskaja, V., & Aschemann-Witzel, J. (2017). Food Waste Avoidance Actions in Food Retailing: The Case of Denmark. *Journal of International Food & Agribusiness Marketing*, 29(4), 328–345. <https://doi.org/10.1080/08974438.2017.1350244>
- Lastovicka, J. L., Bettencourt, L. A., Hughner, R. S., & Kuntze, R. J. (1999). Lifestyle of the tight and frugal: theory and measurement. *Journal of Consumer Research*, 26, 85–98.
- Loebnitz, N., Schuitema, G., & Grunert, K. G. (2015). Who Buys Oddly Shaped Food and Why? Impacts of Food Shape Abnormality and Organic Labeling on Purchase Intentions. *Psychology & Marketing*, 32(4), 408–421. <https://doi.org/10.1002/mar.20788>
- Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), 3065–3081.
- Parizeau, K., Massow, M. von, & Martin, R. (2015). Household-level dynamics of food waste production and related beliefs, attitudes, and behaviours in Guelph, Ontario. *Waste management (New York, N.Y.)*, 35, 207–217. <https://doi.org/10.1016/j.wasman.2014.09.019>
- Quested, T. E., Marsh, E., Stunell, D., & Parry, A. D. (2013). Spaghetti soup: The complex world of food waste behaviours. *SI: Resourceful Behaviours*, 79(0), 43–51.
- Soma, T. (2017). Gifting, ridding and the “everyday mundane”: The role of class and privilege in food waste generation in Indonesia. *Local Environment*, 22(12), 1444–1460. <https://doi.org/10.1080/13549839.2017.1357689>
- Stuart, T. (2009). *Waste: Uncovering the global waste scandal*. London: Penguin.
- Wakefield, K. L., & Inman, J. J. (1993). Who are the price vigilantes? An investigation of differentiating characteristics influencing price information processing. *Journal of Retailing*, 69(2), 216–233. [https://doi.org/10.1016/0022-4359\(93\)90004-3](https://doi.org/10.1016/0022-4359(93)90004-3)
- WRAP. (2011). *Investigation into the possible impact of promotions on food waste: Report, RHF523-002*. Retrieved from <http://www.wrap.org.uk/sites/files/wrap/WRAP%20promotions%20report%20FINAL%2024%201111.pdf>
- Xue, L., Liu, G., Parfitt, J., Liu, X., van Herpen, E., Stenmarck, Å., . . . Cheng, S. (2017). Missing Food, Missing Data? A Critical Review of Global Food Losses and Food Waste

Data. *Environmental science & technology*, 51(12), 6618–6633.
<https://doi.org/10.1021/acs.est.7b00401>

Exploring Household Food Waste and Consumer Loss Aversion

Juliet Memery & Rob Angell

Abstract

Purpose of the Research

This study investigates the concept of loss aversion in household food consumption. It explores how consumers combat the potential for it through uncovering the strategies they implement to reverse the negative outcomes of food waste. It aims to: i) examine the extent to which consumers suffer from feelings/emotions i.e. guilt, at the prospect of wasting food, and ii) discover the practical strategies consumers employ to avoid wasting food, and the emotions i.e. pain associated with it.

Background/Motivation/Support

Food waste is a serious problem with around one third of all food produced globally ending up in the rubbish bin (FAO, 2015), and the UK being the worst offender in the EU (The Guardian, 2015). Household food waste continues to be a major issue for policy makers who see the negative influence it has on issues as divergent as household finance and climate change (UNEP, 2013). Consumers are also concerned – and with good reason. Around 7 million tonnes of food is wasted each year by UK households, 4.2 million tonnes of which is preventable (WRAP, 2016). Contributory factors to this are lack of food/meal planning and consumers overstocking through excessive food purchases, resulting in wasted money as well as food. Such behaviour has not only a financial impact on food consumers' wallets, but also a psychological imprint associated with such actions. Wasting food has the potential to cause significant loss aversion (Kahneman & Tversky, 1979) with associated emotions, e.g. guilt, impacting on mental health and wellbeing. Six in ten consumers admit to feelings of guilt associated with condemning food to the rubbish bin (WRAP, 2012) and 68% feel guilty for wasting money. As an emotion, guilt is a firm antecedent of wellbeing, happiness and satisfaction (Burroughs & Rindfleisch 2002). Kahneman and Tversky's (1979) notion of loss aversion argues that "losses loom larger than gains" (p346), noting that humans are thought to experience significantly more pain from losses, such as throwing away food they have already paid for, than the pleasure received from making a comparable gain (e.g. being given a free meal). Hence, it makes sense that consumers are naturally motivated to avoid behaviours causing pain and negative wellbeing and embrace activities that maximise pleasure and satisfaction (Labroo & Nielsen, 2010). But how might this be achieved in the situation where food waste is likely and pain (and guilt) imminent?

Methodology

A qualitative methodology was undertaken. 30 in-depth interviews were conducted with people responsible for the purchase, storage management, preparation and disposal of food in their household. Sampling followed a snowballing approach, and households were recruited to reflect a mix of the following criteria: 1. Size of household (single, cohabiting, families), 2. Family lifecycle stage (DINKYS; full nest; empty nest). Respondents were asked initial questions

regarding their food shopping and management behaviour before moving on to discuss how often they wasted food, why, what types, etc. and questions pertaining to their feelings of guilt (Mosher, O'Grady, & Katz, 1980) and wellbeing (Underwood & Froming, 1980) associated with it. Respondents were encouraged to discuss the reasons for their behaviour and feelings, so providing a richness to the data. They were also asked to share ways in which they may have avoided wasting food in the past. Finally each interview used a scenario-based projective technique, where respondents were introduced to four hypothetical food waste scenarios and asked to advise a fictional consumer in each of the scenarios about how they might behave were they in the same situation. The purpose of these exercises was to generate a toolbox of strategies for 'what' consumers can do with food that may otherwise be wasted. Data was audio recorded with participant permission and transcribed verbatim. Thematic analysis via NVivo 11 was utilised to analyse the data.

Findings

Preliminary findings indicate that whilst a few respondents stated they wasted some food daily, weekly, or monthly, the majority stated this occurred rarely or never. Of foods wasted the predominant type by far tended to be fresh fruit and vegetables, with bread and bakery items, dairy, meat and drinks all recorded in similar amounts at much lower levels. When asked about their feelings/emotions when they waste food, all respondents mentioned guilt. The vast majority of these mentioned guilt as a negative feeling and in relation to not using food that could have been used by themselves or others. However some did state that they did not feel guilty as the only reason they wasted food was because it was inedible, and so this appeared to mitigate the feeling. A number of respondents mentioned feeling annoyed at wasting food, with this emotion either being aimed at themselves i.e. blame self for not being organised, or for making a rash purchase, or at others i.e. children for not using up a product they had opened, or a partner buying a superfluous product. Other emotions stated on a less frequent occurrences were feeling 'bad', or 'angry' or 'cross', raised by the fact that they do not like waste, and often see themselves as the one to blame if they have forgotten about a food item. The majority of respondents stated the key reason underpinning the emotions they felt was financial i.e. they had wasted food they had paid for. However only slightly less mentioned was it being due to issues around hunger and lack of food for others in the world i.e. feeling guilty for throwing away food when others are struggling to feed themselves. The area of environmental issues i.e. landfill, carbon footprint, were also mentioned but to a lesser degree than the other two underpinning reasons.

Respondents put forward a number of strategies for avoiding food waste, both from personal experience and behaviour, and as suggested outcomes to the hypothetical scenarios. After analysis these were grouped into eight categories according to where they occurred in the consumption cycle. These were subsequently named Planning, Shopping, Storage, Food Management, Cooking and Serving, Food Repurposing, Community, and Non-Food Repurposing, with several strategies to combat food waste proposed under each.

Contributions to Theory and Practice

The preliminary findings from this study indicate that loss aversion (Kahneman & Tversky, 1979) does occur in household food consumption, and particularly in relation to food waste. In keeping with this concept, respondents tried to avoid situations where food may be wasted to avoid the ‘pain’ both financially and emotionally. Respondents stated they felt ‘happy’ and ‘proud’ when they did manage to avoid wasting food. The suggested strategies support the work of Labroo and Nielsen (2010) that consumers try to avoid behaviours that lead to pain and negative wellbeing and look to adopt activities that maximise pleasure and satisfaction.

It is proposed that findings will have the most value to policy makers, consumers, and researchers. To the best of our knowledge, no attempt has yet been made to investigate the facet of guilt in this ‘everyday’ context, or what ‘real’ consumers do to mitigate against the consequence of loss aversion with food that would normally be wasted.

Selected References

- Burroughs, J.E. & Rindfleisch, A. (2002). Materialism and Well-Being: A Conflicting Values Perspective. *Journal of Consumer Research*, 29(3), 348–370.
- FOA, (2015). Global Initiative on Food Loss and Waste Reduction, Food and Agriculture Organization for the United Nations, Rome, Italy. Retrieved from: <http://www.fao.org/3/a-i4068e.pdf> (accessed 5 January 2018).
- Kahneman, D. & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47, 263–291.
- Labroo, A.A. & Nielsen, J.H. (2010). Half the Thrill Is in the Chase: Twisted Inferences from Embodied Cognitions and Brand Evaluation. *Journal of Consumer Research*, 37(1), 143–158.
- Mosher D., O'Grady K. & Katz H. (1980). Hostility-Guilt, Guilt Over Aggression, and Self-Punishment. *Journal Of Personality Assessment*, 44(1), 34-40.
- The Guardian, (2015). UK tops chart of EU food waste. Retrieved from: <https://www.theguardian.com/world/2015/may/22/uk-tops-chart-of-eu-food-waste> (accessed 16 January 2018).
- Underwood, B. & Froming, W.J. (2010). The Mood Survey: A Personality Measure of Happy and Sad Moods. *Journal of Personality Assessment*, 44(4), 404-414.
- UNEP, (2013). Food waste harms climate, water, land and biodiversity - new FAO report. Retrieved from: <https://www.unenvironment.org/news-and-stories/press-release/food-waste-harms-climate-water-land-and-biodiversity-new-fao-report> (accessed 10 February 2018).
- WRAP, (2016). Household Food Waste in the UK, 2015. Retrieved from: http://www.wrap.org.uk/sites/files/wrap/Household_food_waste_in_the_UK_2015_Report.pdf (accessed 10 February 2018).

The Impact Of Social Norms On Suboptimal Food Consumption: A Solution For Food Waste

Isadora Stangherlin, Marcia Barcellos & Kenny Basso

Abstract

Consumers seem to have a reduced preference to buy fruits and vegetables with unusual appearance, products with damaged package and close to the expiration date, usually called suboptimal food products. However, this pattern of behaviour is an important contributor to food waste levels. Interventions aimed at encouraging the purchase of suboptimal food are scarce, however needed. Across two studies, we investigated the effect of social norms in driving suboptimal food consumption. Additionally, it was tested if food waste problem awareness is the underlying mechanism in the relationship between social norms and intention to buy suboptimal food products. Results show that appeals employing social norms positively affect purchases intentions toward the products. Moreover, food waste problem awareness mediates the effect of social norms on intentions to purchase the product with an unusual appearance. We discuss how social norms can be used to tackle food waste and the implications for marketing and policy actions.

Purpose of the Research

The main goal of this study was to investigate whether social norms influence consumers' purchase intentions toward suboptimal food products. A second goal of the study was to analyse if food waste problem awareness explain why social norms can influence the intention to buy suboptimal food products.

Background

Food waste has received increasing attention due to its economic, social and financial impacts. The major problem to deal with the issue is the fact that food losses and waste occur throughout the entire food supply chain. Behaviours that result into waste are considered environmentally negative behaviours (Farr-Wharton, Foth, & Choi, 2014) and interventions aimed at encouraging pro-environmental behaviours are therefore necessary.

Theories of social influence in trying to encourage pro-environmental behaviours are a promising alternative (Nolan, Schultz, Cialdini, Griskevicius, & Goldstein, 2008; Goldstein, Cialdini, & Griskevicius, 2008). Social norms have the power to influence preferences and behaviours (Cialdini, Reno, & Kallgren, 1990), representing the common and accepted behaviour for a specific situation, directly affecting attitudes, intentions, preferences and choices (Cialdini et al., 1990). Despite a large body of research showing the importance and effects of normative influences, we focus on particular new environmentally friendly behaviour, namely the purchasing of suboptimal food products. Fruits and vegetables with different visual appearance, food product with damaged package and close to its expiration date are called suboptimal food products (de Hooze et al., 2017) and previous studies shown the reduced preference to buy and consume these products (Aschemann-Witzel, de Hooze, Amani, Bech-

Larsen, & Oostindjer, 2015; de Hooge et al., 2015; Loebnitz & Grunert, 2015; Loebnitz, Schuitema, & Grunert, 2015). However, this pattern of behaviour is an important contributor to food waste levels. Interventions aimed at encouraging the purchase of suboptimal food are scarce, however needed. No research thus far investigated how to change these patterns of behaviour, especially on how to influence consumers to buy and to consume suboptimal food products in trying to tackle food waste.

Social norms are maximized in uncertain, ambiguous and unclear situations. When consumers are uncertain of a particular behaviour, they tend to look to the behaviour of others, searching evidences of how to act (Griskevicius et al., 2008). The authors stress that this mechanism will particularly occur when conditions have changed, such as an introduction of a new green product. This may be the case when retailers stop rejecting suboptimal food (Loebnitz et al., 2015) and start to sell them. Consumers may face confusion or uncertainty when fruits and vegetables with different appearance, products with close expiration date or products with damages in package start being sold. Normative influences could, therefore, guide consumers' behaviour towards buying suboptimal food products. Creating anti-wastage social norms can help individuals to reduce their waste levels (Stancu et al., 2016). However, thus far this mechanism was not use with suboptimal food products.

Awareness of the consequences of the behaviour is central, specially when promoting environmental behaviours (Redman & Redman, 2014). To suboptimal food, Loebnitz et al., (2015) found that intentions to purchase fruits and vegetables with an unusual appearance are influenced by awareness of food waste problems. Schwartz (1977) postulates that the trait awareness of consequences mediated the impact of norms on altruistic behaviours. Therefore, food waste problem awareness was used in this study to analyse its mediating role between norms and purchase intentions toward the products.

Methodology study 1

Two experiments were used in this study. The first one was a preliminary study to create a realistic norm in study 2. The complete absence of studies indicating how many consumers who have the opportunity to buy suboptimal food buy or approve the purchase of them (which is the role of social norms) was solved by this study. Different messages appeal (environmental, social and financial) were used in this study to capture the frequencies of purchase of each message. The one with higher frequencies was used in the following study. Participants were 127 university students recruited from the south of Brazil. The experiment employed a 3 (message type: environmental, social, financial) x 3 (suboptimal food: unusual appearance, close expiration date, package damaged) with a control group (with no message) mixed-design, with first factor between-subjects and the second within-subjects. Participants were randomly assigned to one of the four experimental conditions. To manipulate the message type, participants were invited to imagine that they were in a supermarket buying food products and visualized the three products separately with the message of the group. The control group did not receive message, just visualized the products. After, participants were asked if they would buy those products, with "yes" or "no" options. Data was analysed with Generalized Estimating Models (GEE) (Zeger & Liang, 1986).

Main findings study 1

Results revealed a significant difference between the message type factor ($X^2Wald(2) = 24.501, p < 0.000$). No significant interaction between the message type and the suboptimal factor was found ($p = .237$). In the same way, the type of suboptimal did not reveal a main effect ($p = .270$). Analyses revealed a significant difference only between the control group and the other three message groups ($X^2Wald(1) = 18.14, p < 0.000$). This means that between the environmental, social and financial messages no differences emerged. However, in order to create a prevalent norm to use in the second study, the social message was used due to the fact that it produced higher frequencies of purchases for each product (72.4%appearance, 58.6%expiration date, 69%package damaged).

Methodology study 2

Study 2 combined the message from the first experiment, using the one that produced higher purchase levels with normative influences. This study was a 2 (normative influence: social norms, without norm) X 3 (suboptimal food: appearance, expiration date, package damaged), using a mixed-design, with the first factor between-subjects and the second within. Total sample size was 119 participants. After seeing the images of each product, participants expressed their purchase intentions on a 7-point scale (1 = "very unlikely", 7 = "very likely"). Food waste problem awareness was adapted from Loebnitz et al. (2015) and was composed by eight items ($\alpha = .757$) measured in a 7-point Likert scale.

Main findings study 2

A mixed-design ANOVA with norms as the between-subjects variable and suboptimal food as the within-subjects variable revealed an interaction between the factors ($F(2, 228) = 3.080, p < .05$). Also main effects for the norm condition ($F(1, 114) = 17.982, p < .000$) and the suboptimal factor ($F(2, 228) = 13.241, p < .000$) emerged. Post hoc tests using the Bonferroni correction revealed that purchases intentions toward suboptimal food was higher in the social norms group ($M = 3.99$) than the control group ($M = 2.90$). The social norms had a significant effect in the carrot with an unusual appearance ($M = 4.75$) when comparing to the control group ($M = 3.29, p < .000$) and in the product with a damaged packaged ($M = 3.56$) compared to the control group ($M = 2.21, p < .001$). However, for the product with a reduced expiration date, no significant difference was found between the social norms ($M = 3.66$) and the control group ($M = 3.19, p = .224$).

To analyze an indirect path of the effect of the norms in the purchases intentions, it was tested the mediation role of food waste problem awareness, using the procedures described by Preacher and Hayes (2004). There is an effect of social norms on food waste problem awareness ($a = 0.41; t = 2.09; p < 0.05$). The food waste problem awareness positively influences the purchase intentions toward the carrot with an unusual appearance ($b = 0.66; t = 3.85; p < 0.005$). The confidence interval (95%) for the indirect effect ($a \times b = 0.27$), computed for each of 5.000 bootstrapped samples, does not include zero or zero effect (0.015 to 0.56), which evidence that there is a significant indirect effect. However, social norms have a direct effect on purchases intentions ($c = 1.19; t = 3.27; p < .005$), which denotes a partial mediation (Zhao et al., 2010).

The relationship between food waste problem awareness and purchases intentions toward the product with a reduced expiration date ($a = 0.26$; $t = 1.48$; $p = .14$) and the product with a damaged package ($a = 0.23$; $t = 1.52$; $p = .13$) was not significant, which evidences that there is no mediation role in these products.

Contributions to Theory and Practice

Given the recent interest in studying suboptimal foods in the food waste literature, this study fills an important gap by studying interventions to increase their acceptance. This study brought a different approach in the study of food waste issues. By using the theory normative influences, a well-developed and well-known conceptual model of behaviour influence, this study proposed to analyse the effect of this stimulus in suboptimal food consumption. Results show that, in a general way, the theory of normative influences is applied to food waste reduction issues, more specifically, with suboptimal food consumption. However, it is necessary to consider the type of sub-optimally when using this influence. Following Loebnitz et al., (2015) suggestion of using communication strategies to understand purchase intentions toward suboptimal food, this study explored the effect of social norms (Cialdini et al., 1990) in suboptimal food consumption. This study corroborates previous ones showing that the acceptance of suboptimal food depends on its characteristics and levels of sub-optimality (de Hooge et al., 2017).

Another contribution is related to the theoretical mechanism by which social norms influences intentions to purchase the products. The result of the mediation analysis in study 2 shows that norms has an impact on the intentions to purchase the carrot with an unusual appearance mediated by the levels of food waste problem awareness of the individuals. The direct effect of this norm on intentions was also significant. However, corroborating Schwartz (1977), awareness mediates the impact of norms. On the whole, by examining the activation of social norms to promote pro-environmental behaviour, this research enriches the literature on social influence, applied in a different context (suboptimal food consumption) and also enriches the literature of consumer-related food waste and food waste reduction.

This research also has several practical implications. For food marketers, the study explored consumers' acceptance of suboptimal food products. This research may be the first to empirically examine strategies to increase acceptance of these products and shed light on consumers' evaluation of this category of foods in trying to help food waste reduction. First, the effects social norms on intentions to purchase suboptimal food indicate that retailers and food marketers can use this strategy in the point of purchase. Retailers reject suboptimal food due to a concern with their consumers (Loebnitz & Grunert, 2015). However, consumers' decision-making regard suboptimal food is positively influenced if they are provided with the appropriate message for that. Therefore, marketing actions can help in food waste reduction (Calvo-Porràl, Medin, & Losada-López, 2017). Food marketers should contribute to the cause of food waste reduction by selling suboptimal food and also have brand benefits with that, increasing, perhaps, their corporate social responsibility (CSR) (Aschemann-Witzel et al., 2016) and use as part of their social marketing communication campaign (Pearson & Perera, 2018).

Additionally, this research holds important implications for advertisers. Campaign designers should use normative influences in trying to communicate the importance of consuming suboptimal food. This research can be assimilated with nudge marketing. In this study, the activation of social norms can be considered a type of nudge used to encourage suboptimal food purchase. Governments can also include in their ads communication about others' behaviours about suboptimal food.

Whereas it is important the implementation and evaluation of food waste reduction initiatives (Melbye, Onozaka, & Hansen, 2017) this study contributes to prevent the waste of suboptimal food, which is food still suitable for human consumption. Additionally, it adds by offering to individuals suggestions on how they can contribute to food waste reduction. However, communication strategies are essential, specially to increase awareness of the issue and to educate consumers of different causes of food waste, such as products about to expire or a damaged packaging. As food waste consequences affect both environmental and social problems, this study advances into a different way to reduce food waste along the food supply chain.

References

- Aschemann-Witzel, J., de Hooge, I., Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-related food waste: causes and potential for action. *Sustainability*, 7(6), 6457-6477.
- Aschemann-Witzel, J., de Hooge, I., & Normann, A. (2016). Consumer-related food waste: Role of food marketing and retailers and potential for action. *Journal of International Food & Agribusiness Marketing*, 28(3), 271-285.
- Calvo-Porral, C., Medín, A. F., & Losada-López, C. (2017). Can Marketing Help in Tackling Food Waste?: Proposals in Developed Countries. *Journal of Food Products Marketing*, 23(1), 42-60.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of personality and social psychology*, 58(6), 1015.
- de Hooge, I. E., Oostindjer, M., Aschemann-Witzel, J., Normann, A., Loose, S. M., & Almlí, V. L. (2017). This apple is too ugly for me!: Consumer preferences for suboptimal food products in the supermarket and at home. *Food Quality and Preference*, 56, 80-92.
- Farr-Wharton, G., Foth, M., & Choi, J. H. J. (2014). Identifying factors that promote consumer behaviours causing expired domestic food waste. *Journal of Consumer Behaviour*, 13(6), 393-402.
- Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of consumer Research*, 35(3), 472-482.
- Griskevicius, V., Cialdini, R. B., & Goldstein, N. J. (2008). Social norms: An underestimated and underemployed lever for managing climate change. In *In*.
- Loebnitz, N., & Grunert, K. G. (2015). The effect of food shape abnormality on purchase intentions in China. *Food Quality and Preference*, 40, 24-30.
- Loebnitz, N., Schuitema, G., & Grunert, K. G. (2015). Who buys oddly shaped food and why? Impacts of food shape abnormality and organic labelling on purchase intentions. *Psychology & Marketing*, 32(4), 408-421.

Melbye, E. L., Onozaka, Y., & Hansen, H. (2017). Throwing It All Away: Exploring Affluent Consumers' Attitudes Toward Wasting Edible Food. *Journal of Food Products Marketing*, 23(4), 416-429.

Nolan, J. M., Schultz, P. W., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2008). Normative social influence is underdetected. *Personality and social psychology bulletin*, 34(7), 913-923.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, 36(4), 717-731.

Redman, E., & Redman, A. (2014). Transforming sustainable food and waste behaviors by realigning domains of knowledge in our education system. *Journal of cleaner production*, 64, 147-157.

Schwartz, S. H. (1977). Normative influences on altruism¹. In *Advances in experimental social psychology* (Vol. 10, pp. 221-279). Academic Press.

Stancu, V., Haugaard, P., & Lähteenmäki, L. (2016). Determinants of consumer food waste behaviour: Two routes to food waste. *Appetite*, 96, 7-17.

Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research*, 37(2), 197-206.

**To Shift Or Not To Shift:
A Cross-cultural Study On Female Disposition To Substitute Meat And Dairy Protein In
The Diet With The Plant Protein Enriched Foods.**

Marija Banovic & Stine Mangaard Sarraf

Abstract

Purpose of the Research

The aim of this study is to explore in cross-cultural context female consumers' attitudes and intentions to substitute animal protein in their diet with plant-protein enriched foods.

Background/Motivation/Support

With a fast rising world population, the demand for more protein is steadily increasing with focus on developing novel and more sustainable plant-based products. It seems that the consumers are also shifting towards more plant-based diets, however, it is not clear up to which point they are ready to substitute conventional foods with novel plant-protein enriched foods. A shift toward more sustainable diet including less animal protein and more plant protein still represents a challenge (Banovic et al., 2018), even though numerous warnings of grim future are laid out if humankind do not comply soon (Aiking, 2011). Increase of plant protein is thus required to support the production of plant protein enriched foods that can replace animal-based proteins in the diet, which in turn can reduce the strain on the environment (Day, 2013). Thus, reducing animal-based protein and replacing it with plant-based protein can positively contribute not only to the environment but also accommodate the challenge of feeding the mouths of the growing population.

Methodology

One thousand three hundred and eight females have been interviewed in an online study in five European countries – Denmark, Finland, Germany, Iceland, and Romania. The interviewed females did not differ in their age ($F(4) = 1.571, p = 0.179$) with the average of 43 years of age.

Attitudes towards usefulness of use plant protein enriched foods in the diet was measured with 4 items – useful, risky, morally acceptable, and should be encouraged, on a 7-point scale with bipolar points (i.e. 1- not at all, 7 – extremely) adapted from (Gaskell, Allum, & Stares, 2003). Intention to substitute meat and dairy protein with plant protein-enriched foods was measured with 3 items on a 7- point semantic differential scale (unlikely/likely, impossible/possible, and improbable/probable) adapted from Yoon, Bolls, and Lang (1998). Frequency of meat and dairy consumption was measured on a categorical scale (i.e. 2-3 times a week, once a week, 2-3 times a month, and once a month or less) (Banovic, Grunert, Barreira, & Fontes, 2010).

Participants were introduced to the study and screened-out based on their knowledge and intention to use plant-protein enriched foods in the diet. Further, their attitudes towards usefulness of use plant protein enriched foods in the diet were assessed, followed by intention to

substitute meat and dairy protein in the diet by plant-protein enriched foods. The survey finished by measuring respondent's frequency of meat and dairy consumption and other socio-demographic characteristics.

Findings

Four items measuring attitudes were checked for reliability and Cronbach alpha improved when item “risky” was taken out (from $\alpha = 0.684$ to $\alpha = 0.904$). Thus, the remaining three items (i.e. “useful”, “morally acceptable”, “should be encouraged”) were averaged and this average was further used in the analyses as an overall attitude towards usefulness of using plant protein enriched foods in the diet. Similar procedure followed for intention to substitute meat and dairy protein in the diet with plant-protein enriched foods. The three items measuring intention were averaged ($\alpha = 0.948$) and used for the following analyses.

Overall, in all countries respondents' attitudes towards usefulness of plant protein enriched foods in the diet were satisfactory. However, the results show significant differences between the countries in terms of their attitudes towards meat substitution with plant protein enriched foods ($F(4) = 21,746, p < 0.001$). The higher attitudes towards use of plant protein enriched foods were observed in Finland, followed by Romania and Germany, while opposite occurred in the case of Iceland and Denmark.

Further, analysis of covariance (ANCOVA) is used to determine whether the variation in the intention to substitute meat and dairy protein with plant protein enriched foods occurs in respect to country, different levels of meat and dairy products consumption and the respondent's attitude towards usefulness of using plant protein enriched foods in the diet.

The overall model had satisfactory prediction ($R^2 = 0.463$, Adj. $R^2 = 0.440$). The results show that intention to substitute meat and dairy protein in the diet is very much influenced by respondents attitudes regarding usefulness of protein enriched foods in the diet ($F(1) = 1053.039, p < 0.001; \beta = 0.769, p < 0.001$). Country factor was also significant as expected ($F(4) = 6.230, p < 0.001$), as well as impact of frequency of meat consumption ($F(3) = 5.590, p < 0.001$) where those countries with higher meat consumption (such as Denmark) had lower intention to substitute meat and dairy protein.

Contributions to Theory and Practice

This study shows that female consumers are open towards use of plant protein enriched foods in the diet and that their attitudes towards these products highly impact their intentions to substitute meat and dairy protein in the everyday food regime. Furthermore the results show that the shift towards more sustainable diet with less animal protein and more plant protein requires at least a positive attitude of consumers and an open intention to buy and use plant-based products. It requires a behaviour change, which needs habituation over time (Banovic et al., 2018; Graca, Calheiros, & Oliveira, 2015). It may be easier if the plant-based products are similar to the animal based products, since it would be more convenient to substitute and incorporate these novel products in the diet.

The industry has a responsibility to develop novel plant-based products and contribute to more variety and diversification of sustainable products, which may increase the probability of replacement animal protein with plant protein so that both industry and consumers can contribute to a more sustainable future. Future studies should look more into concerns related to acceptance of plant-based foods and how they can be fully addressed so that the shift to a more sustainable plant-based diet can actually occur.

Selected References

- Aiking, H. (2011). Future protein supply. *Trends in Food Science & Technology*, 22(2), 112-120.
- Banovic, M., Arvola, A., Pennanen, K., Duta, D. E., Brückner-Gühmann, M., Grunert, K. G., & Lähteenmäki, L. (2018). Foods with increased protein content: A qualitative study on European consumer preferences and perceptions. *Appetite*, 125, 233-243.
- Banovic, M., Grunert, K. G., Barreira, M. M., & Fontes, M. A. (2010). Consumers' quality perception of national branded, national store branded, and imported store branded beef. *Meat Science*, 84(1), 54-65.
- de Boer, J., Schösler, H., & Aiking, H. (2014). "Meatless days" or "less but better"? Exploring strategies to adapt Western meat consumption to health and sustainability challenges. *Appetite*, 76(0), 120-128. doi:<http://dx.doi.org/10.1016/j.appet.2014.02.002>
- Gaskell, G., Allum, N., & Stares, S. (2003). Europeans and biotechnology in 2002: Eurobarometer 58.0. *Brussels: European Commission*.
- Graca, J., Calheiros, M. M., & Oliveira, A. (2015). Attached to meat? (Un)Willingness and intentions to adopt a more plant-based diet. *Appetite*, 95, 113-125. doi:10.1016/j.appet.2015.06.024
- Yoon, K., Bolls, P., & Lang, A. (1998). The effects of arousal on liking and believability of commercials. *Journal of Marketing Communications*, 4(2), 101-114.

Cannabis-infused Food And Canadian Consumers' Willingness To Consider "Recreational" Cannabis As A Food Ingredient.

Charlebois Sylvain

Abstract

At the time of this study, the Canadian government intends to legalize the use of recreational marijuana. Despite its intentions, the regulatory framework remains ambiguous. Food businesses, with their constant search for growth, are considering launching several food products with marijuana as an ingredient, once the drug is legalized. This study does not look at the health effects of marijuana per se, but rather consumers' perception of marijuana as a food ingredient through the lens of food innovation, if it were to be legalized. It explores several dimensions, including marijuana-infused food products sold in grocery stores and dishes served at restaurants. It evaluates potential times when consumers would consume these products, in addition to their preferred food products. The survey also looks at perceived risks related to specific demographics such as children and pregnant women. The survey assesses both perceived risks and anticipated behaviour in a market in which a former illicit product becomes readily available.

The results show that Canadians, although mostly favourable to marijuana's legalization and willing to try marijuana-infused food products, are concerned about health risks the drug represents, especially for young children. Results also suggest that most Canadians do not feel knowledgeable enough to cook with marijuana at home, which opens an opportunity for leaders in the industry. Finally, the study presents limitations and suggested future paths for research.

Introduction

In the 21st century, economic growth in developed countries has led to rising demand for products that must go beyond basic needs and seek to satisfy rapidly shifting wants and desires. Coincident with this growth, social and environmental awareness has increased, creating higher demand for sustainable, healthy food and an opportunity for food companies to add value through innovation in new products (Dutra De Barcellos, 2015). Innovation can be driven by the inclusion of specific ingredients, as we have seen in the development of functional foods in recent years. Changes to the quality and fabric of our food supply are often inspired by market-based research which captures consumer sentiment related to innovative ideas for new foods.

However, little empirical work has been done to assess how consumers perceive food innovation in cases where a long-standing illicit ingredient, if made legal (marijuana in this case), may be incorporated into food products. Marijuana, specifically non-medicinal or recreational marijuana, is the subject of this study.

At the time of this study, the Canadian government intends to legalize recreational marijuana, or as it is also known, non-medicinal marijuana or marijuana for adult-use (Rankin, 2017). Despite

government intentions, a national regulatory framework for legalized marijuana still remains ambiguous.

Canada would not be the first nation to consider making recreational marijuana legal. Uruguay, in 2014, became the first country to legalize the sale and distribution of marijuana. In 2012, Washington State and Colorado are just two US states that have legalized the recreational use of marijuana. Many industrialized countries are also considering making marijuana legal for recreational purposes. In more than 11 European countries, including the Netherlands, Belgium, and Spain, marijuana is legalized for medicinal use or is decriminalised. Australia joined the list of countries where medicinal marijuana became legal in 2016. Canada legalized medical marijuana in 2001, although accessibility is still restricted and highly regulated through Health Canada. Germany will likely follow suit with medical marijuana sometime in 2018 (The Lancet Oncology, 2017).

Marijuana is the most widely used illicit drug in the developed world and its use has long been associated with negative social and economic outcomes (Barrett and Bradley, 2012). It is estimated that over 170 million people world-wide consume marijuana daily (Patel and Cone, 2015). However, the challenge for policymakers and public health advocates is to navigate through the myriad of possibilities regarding the widespread consumption of marijuana by a larger portion of the population (Barry, Hiilamo and Glantz, 2014).

By legalizing recreational marijuana, many wonder how it could impact communities. Canada is following the footsteps of a few states in America. In Canada, since the federal government's announcement, several food companies, processors, and distributors, have been considering the possibility of commercializing marijuana-infused products. In some US states where marijuana is legal, consumers can purchase a variety of marijuana-infused food products; this includes fudge, cookies, brownies, hard candies, gelato, and gummy bears. In fact, more companies have reported interest in developing new food products, using marijuana as an ingredient. In line with functional foods that add value to conventional foods, the use of marijuana could be interpreted as an ingredient which can support a functional food strategy (Fitzpatrick, 2007).

Edible marijuana products have been tremendously popular in the United States of America. Some products, like marijuana brownies have long been a staple of marijuana coffee shops in parts of the world. The food service (restaurants and fast food) industry is considering its options with the looming legalization of marijuana. However, new products such as hard candy or gummy bears may deceive those looking for their favourite sweet treat, as these infused products are skillfully produced and packaged to closely mimic popular candies and other sweets. Edibles containing marijuana's active ingredients – mainly cannabidiol (CBD) and tetrahydrocannabinol (THC) – raise public health concerns, particularly the risk of consumption by children (Maccoun and Mello, 2015; Potera, 2015).

As said, there is little research on how consumers perceive legal marijuana as a potential food ingredient in the future. The use of marijuana as an ingredient in foods is an embryonic, yet rapidly developing area of food innovative interest. Most studies on marijuana consumption look at potential health effects and policy impacts of smoking or vaporizing the plant. This study does not look at the health effects of marijuana per se, but rather at consumers' perception of

marijuana as a food ingredient through the lens of food innovation (Colurcio, Wolf, Kocher and Spena, 2012). It explores several dimensions, including marijuana-infused food products sold in grocery stores and dishes served at restaurants, and at home cooking. The study evaluates potential times when consumers would consume these products, in addition to preferred food products. The survey also looks at perceived risks related to specific demographics such as children and pregnant women (Ortega-Requena and Rebouillat, 2015). The survey assesses both perceived risks and anticipated behaviour in a market in which a formerly-illicit product becomes readily available for general public consumption.

Finally, the study presents limitations and future paths for further research.

Marijuana and society

Although socio-economic challenges associated with legalized marijuana use may be viewed as a more recent event, marijuana itself is not a new drug. The cannabis plant has been harvested and used both for its intoxicating properties and for its fiber throughout the world for more than ten thousand years (Lasagna and Lindsey, 1983). In fact, marijuana was once legal in Canada and it was only in 1923 when marijuana became illegal in Canada, following in the footsteps of the United States (Reico, 2002).

Some have suggested that the effects of marijuana and alcohol on driving performance can pose significant risks to society (Downey et al., 2013). Making some drugs more readily available to children may also represent heightened risks, especially if consumer through edible forms (Berger, 2014; Carolan, 2016). Others have suggested that exposure to marijuana can also be harmful to pregnant women (Benevenuto et al., 2017). Results indicate that consuming marijuana during pregnancy, even at low doses, can be embryotoxic and fetotoxic, increasing implantation failures and compromising fetal development. For this reason, marijuana legalization has raised the spectre that it may have significant, adverse social and physiological effects on newborn children.

The literature, in general, suggests that there is little about marijuana's effects that is straightforward (Bostwick, 2012). Many social stigmas related to marijuana use remain. For example, studies have claimed that drug policies are most often intertwined with racial tensions in society, especially related to the black community. Furthermore, the disparities in people-of-colour imprisonment rates are more pronounced for drug offenses than for any other type of crime (Reuter, 2013). Individuals with lower cognitive ability are more likely to use cigarettes, alcohol, and marijuana. Reversely, individuals with high cognitive ability are likely to use less substances, including marijuana (Ponnam and Balaji, 2015). Also, consumption at work can be a challenge akin to alcohol or other drugs.

Many studies have assessed risks related to children, and research shows marijuana use can damage developing brains in children and youths. With the increasing use of marijuana and the expansion of marijuana into food products, the risk of such exposure may increase in the future (Wang, Narang, Wells, and Chuang, 2011). Many food products containing marijuana, such as candy and desserts, could attract children to ingesting these products, if proper precautions are

not taken. At the same time, there is little research about the safety of using marijuana or cannabinoids with children (Melville, 2013; Rollins, 2014).

Food innovation

Food businesses are in a constant quest for growth as they adapt to regulations (Magistris, Pascucci and Mitsopoulos, 2015). They will display opportunistic behaviour by either following or setting demand-driven trends which often become benchmarks for growth (Olper, Pacca and Curzi, 2014). As the food industry provides new products through innovation, it contends with market conditions affected by factors such as economic cycles, industry architecture and technologies, as well as regulations.

The Canadian food marketplace is significantly influenced by an oligopoly in food retail and distribution, where five (5) large companies share almost 90% of the market. Seeking ways to grow revenue can be challenging in this environment, compared to other countries. How marijuana as an ingredient is perceived as a potential opportunity will arguably vary between food distributors. Some Canadian food retailers' own pharmacy chains and non-traditional food retailing outlets which can offer an interesting solution for selling marijuana, or marijuana-infused food products. The arrival of recreational marijuana could also affect the food service industry, which is called upon to innovate frequently.

Given demographic challenges, the food industry continuously looks at how it can increase revenues (Wang et al., 2015). For this reason, novelty in food represents a natural opportunity for growth. A distinct body of regulations is dedicated to control the introduction of novel food products and ingredients. Even if a food product or ingredient is widely consumed, without any evidence regarding food safety, the food item may still be considered a novelty product.

The nature or degree of food innovation can vary based on what is aimed to be achieved. A radical innovation results in something new, whereas an incremental innovation results in something improved. Radical innovations are associated with fundamental change, such as a new product or process, and are often implemented through a specific innovation project. Incremental innovations are more typically ingredient-driven concepts based on a previous innovation, such as changing the materials used to make an enhanced product, or improving service quality (Baregheh, Rowley, Sambrook and Davies, 2012). Marijuana and marijuana-infused food products, therefore, would fit in the latter category.

Food innovation is also essential for the growth of the food economy. A food business tends to consider new ingredients when it wants to innovate and create a new cycle of growth for certain products or line of products (Rioux, Beaulieu and Turgeon, 2017). The industry has been particularly successful with the use of functional ingredients as seen with the most recent revolution of gluten-free products (Jnawali, Kumar and Tanwar, 2016). Across the globe, the gluten-free retail market has expanded rapidly beginning at \$1.7bn in 2011, and will likely reach \$4.7bn by 2020 (Terazono, 2017). In the past, gluten free products were niche products that were scarce and difficult to find. Innovation has made gluten-free foods more palatable and

convenient, helping to boost the number of products available. The “free-from” and organic markets have also grown rapidly, but remain a marginal portion of the overall food marketplace.

Shoppers will purchase these food products for a variety of reasons. However, it seems that sales are driven by consumers who claim to suffer from a food intolerance, a disease, or an eating disorder of sort. It is projected that more than half of all food shoppers include an allergen-free product in their regular basket of purchases.

While recreational marijuana can be consumed by anyone, what motivates consumers to do so may vary. The lack of data in this matter means that it is not clear whether consumers perceive marijuana as a healthy ingredient, or a desirable addition to their diet.

Using marijuana as a food ingredient can be appealing for the food industry as it supports a growth-focused strategy, but the pattern to growth can be interrupted by several factors (Figure 1). These affect industry and consumers equally at multiple levels, and at different times since the significance of each determinant can change over time. Inclusion of a novel food ingredient can be considered one of the cornerstones of a successful new product launch. However, the trust of consumers as to the functionality and safety of that ingredient relies on its source (brand), perceived novelty, and most importantly, perceived benefits (Khan et al., 2013). Targeting a broader audience to increase the sales volume and penetrate numerous market segments has been suggested as central to the successful commercialization of enhanced food products. It essentially reenergizes demand for food products. Marijuana could serve such a purpose.

Figure 1

A retail environment (atmospherics) is not just about creating a pleasant atmosphere for shoppers, but about supporting a “congruent” relationship between atmosphere and the product(s) being consumed, or consumed later (Spendrup, Hunter and Isgren, 2016). With the arrival of recreational marijuana on the market, this can be impacted by regulation or business strategy, or both. Channels (such as food service outlets) can also leverage the successful launch of a new food product. The distribution of marijuana and marijuana-infused food products is expected to be a key factor in making products accessible and marketable to the public. With marijuana, however, the regulatory framework regarding its distribution still remains ambiguous.

Design thinking, which can support successful food innovation initiatives, reinforces the importance of consumer acceptance and empathy. To be able to develop good solutions, innovation teams need to appreciate the perceptions and needs of the consumer. Food innovators generally think and feel about innovation in relation to the problem the industry aims to solve (Olsen, 2015). Understanding and empathizing with consumers when looking at marijuana-infused products can be challenging, since their needs may be ill-defined, distorted, or indefinite due to social stigmas and perceived risks. The focus might be on dietary requirements, or could be more about a general pleasurable experience and response to social patterns, or perhaps simple curiosity, or even perceived novelty. Consumers may also lack trust in a product or brand if there is insufficient information available on which to form an opinion; this may certainly be the case with marijuana. As such, adding the voice of the consumer into the product innovation

process will be increasingly essential for proper development of food science and technology (Baugreet, Hamill, Kerry and McCarthy, 2017).

Methodology

This exploratory study is derived from an inductive, quantitative analysis of primary data obtained from an online survey of adults, aged 18 and over, living in Canada for at least twelve months. The survey instrument was divided into three parts. The first part included questions related to general perceptions of marijuana consumption. Respondents were asked if they were favourable to the legalization of marijuana in general, and if they consumed any medicinal marijuana. We attempted to understand if there were any correlations with other food-based queries. The second section asked about motivations for consuming recreational marijuana in certain contexts, perceived risks and benefits. This part evaluates the willingness to purchase in food retailing and/or service (restaurants). In the last section, questions about gender, age, education, and income were used to assess socio-economic characteristics of participants. Pretesting of the survey instrument took place prior to launching it online, to ensure that questions were clear and understandable. Because Canada has two official languages, all questions were translated into French, and meaning and tone was verified. The survey instrument can be found in Appendix A.

The final online survey was administered over a one-month period in August 2017. Using an approach consistent with similar studies on food consumption and trends (Beardsworth & Bryman, 2004; Redmond & Griffith, 2004), the survey was widely distributed (in French and English) across the country using *Qualtrics*, targeting several different regions and socio-economic groups. Invitations were also posted on social media outlets and respondents were sought through an open invitation. Full representation of the Canadian population was achieved by monitoring results daily, and modifying recruitment among underrepresented demographics. Regions measured were the Atlantic Region, Québec, Ontario, the Prairies, and British Columbia (BC). These geographical locations for the survey were chosen to maximise regional and socioeconomic variability. Since this was an exploratory study, a sample size of 1087 was considered adequate. Each respondent took an average of 2 to 3 minutes to fill out the survey. The completion rate for the survey was 94%, which is relatively high for surveys of this type (Larose and Tsai, 2014).

Results

The sample obtained in the survey proportionally represents the Canadian population in terms of gender, income, age groups, location, education and number of children in the household. Of all surveyed, a total of 68% either agree or strongly agree with the national legalization of marijuana. A total of 5.5% indicate that they consumed marijuana, medicinally. The survey also highlights how respondents perceive risks related to children being exposed to marijuana because of legalization. Results suggest that 58.5% of respondents either agree or strongly agree with the question addressing concerns about the risks for children and young developing adults who may have more access to marijuana once its recreational use is legalized.

On questions related to the willingness to consume foods infused with marijuana, the survey generated interesting results. Just under half (45.8%) of respondents claim to be willing to try a marijuana-infused food product, once it is legalized. Types of products which attract respondents vary. Most respondents indicate that they would be interested in bakery products: 46.1% of respondents say they would try a bakery product, followed by other ready-to-eat products, such as candy (with 26%), and simple oils (24%) (Figure 2). There is still a sizeable portion of consumers who are not so certain: 44.5% of respondents surveyed would not purchase commercial products with marijuana in it. This may suggest a significant knowledge gap, or a broader lack of trust, exists.

The survey also explores perceptions on the usage of marijuana for cooking purposes. Cooking seems to represent a challenge. Less than 20% (19.5%) feel knowledgeable enough, to varying degrees, to use marijuana at home in their cooking.

Consumption in food service was also explored in this survey. Several questions were asked on consumer willingness to order at a restaurant. A total of 38.5% of respondents agree they would consider ordering a dish infused with or including marijuana as an ingredient at a restaurant. This is slightly lower than the level of willingness to buy a marijuana-infused food product at a grocery retailer. When considering marijuana as an alternative to alcohol, 26.6% of respondents agree or strongly agree with the concept of replacing an alcoholic drink with marijuana at a restaurant. That percentage is much lower than expected.

Health perceptions related to marijuana consumption were included in the survey and it is apparent that this is an area where consumers may need better understanding. Fewer than 13% (12.6%) of respondents consider marijuana as a healthy ingredient. Overconsumption appears to be a concern for many respondents: six of ten respondents (59.8%) say they are apprehensive about eating too much marijuana-infused food and worry that the effects may be too strong. Respondents could be concerned about the psychoactive effects of the drug, and may not understand how marijuana can affect their metabolism and overall health.

Respondents' willingness to buy and their motivations were also explored as part of the survey. For example, almost half of respondents (46.9%) say they would try marijuana based on curiosity. And marijuana's psychoactive effects attract more than 44% of respondents to try the product. These two results are intriguing, given the apprehension of respondents in the earlier question (above).

Provenance and quality are of interest to consumers. As can be seen in Figure 3, the traceability of the product is of importance to many respondents. Consumers expect information at retail to be accurate and many expect to be notified of the origin of the product before its purchase.

In this survey, 12.5% say they would try marijuana for its taste. The time of day for consumption was also investigated through the survey. An overwhelming number of respondents (83.5%) would consider consuming marijuana at night and on weekends. During mealtime, the preference is for dinner (33%), lunch (8.2%) and breakfast (7.2%). Some say they would consider consuming marijuana between meals (28.9%).

Our analysis also produced correlations between measures of marijuana consumption as a food ingredient and survey demographics. First of all, people with children are more likely to be concerned about the health of children and marijuana consumption; this is not surprising. Second, the older the respondent, the more likely the respondent is concerned about the health of children. Again, this result is not surprising. Home cooking likewise generates interesting outcomes and suggests that there may be a business opportunity. Younger respondents and households with higher incomes tend to be more comfortable with the idea of cooking at home with marijuana compared to other respondents. The insinuation here is that younger, upwardly-mobile (perhaps single) adults can be a target audience for home cooking with marijuana and marijuana-infused products.

Another noteworthy result is that the higher household income is, the less likely the respondent views marijuana as a healthy alternative. This seems a counter-intuitive to the above findings regarding home cooking.

Discussion

The results offer mixed messages related to the legalization of recreational marijuana as used in food products. Overall the results of the survey suggest there is confusion about what legalized marijuana would mean to consumer diets.

While a majority of respondents are favourable to the legalization of marijuana itself, they also reflect concerns about its health benefits in food products and, more significantly, the risks to children. Results similarly show that respondents do not see marijuana as a healthy alternative or an ingredient they would include in a healthy dietary regime. Furthermore, several respondents expressed concerns about consuming too much marijuana, which might cause negative health and/or social consequences.

Food innovation is often inspired by needs, wants, or benefits sought by consumers. In the case of marijuana, curiosity seems to be a substantial driver that may attract consumers to food products, whether it is at a retail store or in a restaurant. The effects one would experience by consuming marijuana is of interest too, but the data do not show whether this would be a long term driver of consumption. This curiosity magnifies the concerns that marijuana-infused food products could become readily accessible by children. There is clearly an opportunity for the industry to educate consumers, and for regulators to respond to these concerns so that the risk is mitigated.

For the food service industry, respondents claim that marijuana-infused dishes do not represent an alternative to replace alcoholic drinks. Respondents seem to see them as separate alternatives in leisure; however the interest is palatable. While based on the survey results it may be argued that marijuana-infused products are an option consumers will consider at retail outlets and in restaurants, they do not yet feel well-equipped to use marijuana at home to cook. Responses show a significant vacuum of knowledge on marijuana as a food ingredient generally, including cooking at home.

The regulatory framework for legalized marijuana still remains unclear, which opens up an opportunity for the industry with attendant risks. Given market synergies at play, and in an increasingly competitive environment, food businesses constantly look for new ways to grow. Marijuana represents a potent path to increase revenues. Given the perceived benefits and risks suggested by this survey, the food industry, including retail and food service, should proceed with caution, if recreational marijuana be legalized. There is a good deal of confusion about whether marijuana is a healthy dietary option, and vague concerns about transparency and potency of products made with it. All of these factors would make it challenging to develop and position edible marijuana products in the market. At the very least, it suggests that the industry has work to do in order to educate consumers and build trust.

To our knowledge, this is the first Canadian survey that looks at how consumers would react to a food environment in which legalized recreational marijuana would be available. A strength of this study is the recruitment of a national sample from varying age and socio-economic circles, within Canada. Limitations are that the survey was not fully representative of all Canadians, and cannot be compared with other countries due to methodological differences that are likely to be present. In addition, this survey primarily assessed perceptions based on an assumption that recreational use of marijuana is legalized. This may not reflect reality currently faced by food consumers, and there may be a built-in bias towards stronger or weaker agreement on the true nature of concerns they may have. Despite these limitations, the exploratory nature of this study provides valuable insights, which can be used as a foundation for future research on how marijuana would be perceived as a food ingredient.

From a policy perspective, much work is required. While both provincial and federal governments may see the legalization of recreational marijuana as a new source of substantial revenues, risks associated with the marijuana use as a food ingredient has not been clearly articulated. With any regulatory framework, the science of risks must be examined and this holds true of recreational marijuana. The development of food products with marijuana needs to be clearly communicated through health care channels and with public health professionals. This is especially applicable for edible food products that may pose risks for children and/or young adults. Trade groups and the marijuana industry may be aware of these risks, but there has been little or no communication nor any guidelines given by public authorities on this matter. This might lead to tactical and opportunistic decisions by individual businesses, potentially increasing risks for society as a whole.

Conclusion

This study is believed to be the first of its kind in Canada. The results point to a need for broader public dialogue (including with consumers) on recreational marijuana as a food ingredient. More research is required to better appreciate the specific interests of consumers, and the sociological and economic dimensions of incorporating marijuana in food. Most importantly, recreational marijuana as a food ingredient could very well increase the risk of exposure to the product by children and youths. Additional research is needed to quantify the benefits and risks of marijuana

in food products, so that health care professionals can conduct well-informed discussions with medical professionals, food businesses and consumers.

References

- Barrett, P., & Bradley, C. (2012). An investigation of the attitudes and awareness of the risks associated with marijuana use in an Irish adolescent population. *Archives of Disease in Childhood*, 97(Suppl 1), A74.
- Baregheh A., J. Rowley, S. Sambrook, & D. Davies. (2012). Innovation in food sector SMEs. *Journal of Small Business and Enterprise Development*, 19(2), 300-321.
- Barry, R., Hiilamo, H., & Glantz, S. (2014). Waiting for the Opportune Moment: The Tobacco Industry and Marijuana Legalization. *The Milbank Quarterly*, 92(2), 207-242.
- Baugreet, S., Hamill, R., Kerry, J., & McCarthy, S. (2017). Mitigating Nutrition and Health Deficiencies in Older Adults: A Role for Food Innovation? *Journal of Food Science*, 82(4), 848-855.
- Benevenuto, Sarah G., Domenico, Marlise D., Martins, Marco Antônio G., Costa, Natália S., De Souza, Ana Rosa L., Costa, Jose L., . . . Veras, Mariana Matera. (2017). Recreational use of marijuana during pregnancy and negative gestational and fetal outcomes: An experimental study in mice. *Toxicology*, 376, 94-101.
- Berger, E. (2014). Legal marijuana and pediatric exposure pot edibles implicated in spike in child emergency department visits. *Annals of Emergency Medicine*, 64(4), A19-21.
- Bostwick, J. (2012). Blurred Boundaries: The Therapeutics and Politics of Medical Marijuana. *Mayo Clinic Proceedings*, 87(2), 172-86.
- Carolan, M. (2016). Adventurous food futures: Knowing about alternatives is not enough, we need to feel them. *Agriculture and Human Values*, 33(1), 141-152.
- Downey, L., King, R., Papafotiou, K., Swann, P., Ogden, E., Boorman, M., & Stough, C. (2013). The effects of marijuana and alcohol on simulated driving: Influences of dose and experience. *Accident Analysis & Prevention*, 50, 879-886.
- Fitzpatrick, K. (2007). Innovation in Western Canadian Functional Food Ingredients. *Cereal Foods World*, 52(5), 289-290.
- Jnawali, Kumar, & Tanwar. (2016). Celiac disease: Overview and considerations for development of gluten-free foods. *Food Science and Human Wellness*, 5(4), 169-176.
- Khan, Rao Sanaullah, Grigor, John, Winger, Ray, & Win, Alan. (2013). Functional food product development – Opportunities and challenges for food manufacturers. *Trends in Food Science & Technology*, 30(1), 27-37.
- Lasagna, L., & Lindzey, G. (1983). Marijuana policy and drug mythology. *Society*, 20(2), 67-78.

- Maccoun, Robert J., & Mello, Michelle M.. (2015). Half-Baked — The Retail Promotion of Marijuana Edibles. *The New England Journal of Medicine*, 372(11), 989-991.
- Magistris, de, T., Pascucci, S., & Mitsopoulos, D. (2015). Paying to see a bug on my food: How regulations and information can hamper radical innovations in the European Union. *British Food Journal*, 117(6), 1777-1792.
- Barcellos, Marcia Dutra de., Bossle, Marilia B., Gattermann Perin, Marcelo., Vieria, Luciana. (2015). Consumption of Eco-Innovative Food: How Values and Attitudes Drive Consumers' Purchase of Organics? *REMark*, 14(1), 110.
- Colurcio, M., Wolf, P., Kocher, Pierre-Yves, & Russo Spena, T. (2012). Asymmetric relationships in networked food innovation processes. *British Food Journal*, 114(5), 702-727.
- Melville, N. (2013). Seizure disorders enter medical marijuana debate. *Medscape*. Retrieved from http://www.medscape.com/viewarticle/809434_print
- Oldham, G., & Gordon, B. (1999). Job Complexity and Employee Substance Use: The Moderating Effects of Cognitive Ability. *Journal of Health and Social Behavior*, 40(3), 290-306.
- Olper, Pacca, & Curzi. (2014). Trade, import competition and productivity growth in the food industry. *Food Policy*, 49, 71-83.
- Olsen, N. (2015). Design Thinking and food innovation. *Trends in Food Science & Technology*, 41(2), 182-187.
- Ortega-Requena, & Rebouillat, S. (2015). Bigger data open innovation: Potential applications of value-added products from milk and sustainable valorization of by-products from the dairy industry. *Green Chemistry*, 17(12), 5100-5113.
- Patel, S., & Cone, R. (2015). A cellular basis for the munchies. *Nature*, 519(7541), 38-40.
- Ponnam, A., S, S., & Balaji, M. (2015). Investigating the effects of product innovation and ingredient branding strategies on brand equity of food products. *British Food Journal*, 117(2), 523-537.
- Potera, C. (2015). Kids and Marijuana Edibles: A Worrisome Trend Emerges. *The American Journal of Nursing*, 115(9), 15.
- Rankin, J. (2017). Physicians disagree on legal age for cannabis. *Canadian Medical Association Journal*, 189(4), E174-E175.
- Recio, G. (2002). Drugs and Alcohol: US Prohibition and the Origins of the Drug Trade in Mexico, 1910-1930. *Journal of Latin American Studies*, 34(1), 21-42.
- Reuter, P. (2013). Why Has US Drug Policy Changed So Little over 30 Years? *Crime and Justice*, 42(1), 75-140.
- Rioux, L.E., Beaulieu, L., & Turgeon, S.L. (2017). Seaweeds: A traditional ingredients for new gastronomic sensation. *Food Hydrocolloids*, 68, 255-265.

Rollins, J. (2014). Pot for Tots: Children and Medical Marijuana. *Pediatric Nursing*, 40(2), 59-60.

Spendrup, S., Hunter, E., & Isgren, E. (2016). Exploring the relationship between nature sounds, connectedness to nature, mood and willingness to buy sustainable food: A retail field experiment. *Appetite*, 100, 133-141.

Terazono, E. (2017, May 01). Boost for sales of gluten-free products. *Financial Times*, p. 16.

The Lancet Oncology. (2017). Marijuana: High time for evidence-based policies. *The Lancet Oncology*, 18(1), 1.

Wang, Emily A, McGinnis, Kathleen A, Goulet, Joseph, Bryant, Kendall, Gibert, Cynthia, Leaf, David A, . . . Fiellin, David A. (2015). Food Insecurity and Health: Data from the Veterans Aging Cohort Study. *Public Health Reports*, 130(3), 261-268.

Wang, G.S., Narang, S.K., Wells, K., & Chuang, R. (2011). A case series of marijuana exposures in pediatric patients less than 5 years of age. *Child Abuse & Neglect*, 35(7), 563-565.

Potential Of Functional Foods In Disease Prevention

Brigitta Plasek, Zoltán Lakner, Gyula Kasza & Ágoston Temesi

Abstract

Purpose of the Research

The aim of the research has been to determine the consumers' acceptance of consumption of functional foods in disease prevention. The framework of our research is shown in the first figure.

Fig. 1. Framework of the research

The complex optimisation of prevention measures is a difficult task, because we have to take into consideration a complex set of medical, economical, sociological, and psychological factors. If we would like to build a well-founded marketing strategy of functional food products, we have to know where the place of these products is in consumers' mind. The purpose of the current research has been to estimate the mental position of functional food in the context of other possible ways and means of prevention in case of some frequent diseases, which concern a relative wide range of population.

Background/Motivation/Support

According to the statistical data of WHO in 2012 in Hungary cardiovascular diseases, diabetes, obesity, cancer and chronic respiratory disease caused 24% of deaths between the ages 30 and 70. Among the European countries this is one of the highest, which also shows a high mortality rate associated with noncommunicable diseases (WHO, 2016).

With a healthy lifestyle and healthy eating the spread of these diseases would be preventable, and consumers are also aware of the importance of these two things (Szakály et al., 2010), but their actions are suppressed by some factors. According to the results of Szakály (2009) 70-80% of their respondents show an interest towards healthy lifestyle, but only 30-55% of them are actually doing something for it.

Because of the complexity of functional food products in the development process it is important to know which diseases are worrying consumers (Van Kleef et al., 2005). But only knowing these diseases is not enough, we should also know how the consumers would prevent them. We do not know which diseases are the ones that consumers would prevent with health protecting (functional) food products (Siró et al., 2008, Bagchi&Nair, 2016), and it is an open-ended question where these products are in the minds of consumers.

Parallel with the increase in standard of living as well as health literacy, there is a growing attention towards disease prevention in all developed states (Beaglehole & Yach, 2003, Atkins, 2005). It is an evidence based fact, that the morbidity of non-communicable diseases (e.g. neoplasms, cardiovascular diseases, osteoporosis, migraine, depressive disorders, apnoea) can be significantly decreased by prevention (Boutayeb & Boutayeb, 2005, Mendis, 2014). There is a widening portfolio of different ways and means of prevention measures.

The prevention of non-communicable diseases offers new horizons for the food and pharmaceutical industry. There has been formed a positive loop (feedback) between the

increasing health concern of society and the marketing activity of nutraceutical industry: a striking example of this phenomenon is the fact, that the number of sold nutritional supplements in the US market has increased from $4 \cdot 10^3$ to $9 \cdot 10^4$ between 1994 and 2014 (Starr, 2015). In the opinion of Bailey et al. (2011, 2012) the most intense consumers of nutritional (dietary) supplements are those segments of society which do not need these products. Paradoxically, De Nooijer and colleagues (2012) say that those who would need these products (e.g. children) don't consume them.

Based on the overview of the relevant literature, there are four typical possibilities of prevention/treatment in case of adults: consumption of medicines; consumption of nutrition/dietary supplements; functional foods and change of way of life (e.g. increased physical activity).

Methodology

Our method has been based on a face-to-face administered questionnaire, which has been filled out by 1027 respondents. The interviews have taken place between 4-19 March 2013 in five big Hungarian cities: Budapest, Pécs, Sopron, Nyíregyháza and Szeged. The sampling has been based on quotas, trying to represent the socio-economic structure of the Hungarian society. In the questionnaire we asked consumers which diseases worry them from the chosen 13, and which are the ones that they would make financial effort to prevent it.

Results of responses have been analysed by different algorithms of IBM SPSS 22.0 program package. The group effect of different factors on acceptance of prevention methods have been tested by log-linear analysis. With the regression analysis we used enter method, the significance level was 95% (Wald chi square ($p < 0,05$)).

Findings

Our first question was which diseases are those that worry consumers. In the first table we introduce the results of this question.

Table 1: The attitude of respondents towards different health problems and their propensity to pay to decrease the probability of its occurrence

<i>Disease</i>	<i>Concerns, and the respondent is <u>ready to invest to prevent it</u></i>	<i>Concerns, but the respondent does not want to invest to prevent it</i>	<i>Does not concern respondents</i>
<i>Cancer</i>	57%	21%	22%
<i>Cardiovascular diseases</i>	49%	28%	23%
<i>Weakened immune system</i>	48%	24%	28%

<i>Diabetes</i>	42%	24%	34%
<i>Osteoporosis</i>	38%	26%	36%
<i>Joint diseases</i>	37%	31%	32%
<i>Skin diseases</i>	33%	28%	39%
<i>Digestion problems</i>	33%	33%	34%
<i>High level of cholesterol</i>	32%	33%	35%
<i>Respiratory diseases</i>	32%	32%	36%
<i>Concentration problems</i>	32%	30%	38%
<i>Migraine</i>	26%	27%	47%
<i>Unbalanced mood, apnoea</i>	21%	35%	44%

Obviously, the majority of respondents have anxiety about different diseases (Table 1). The highest level of anxiety could be detected in the case of cancer and cardiovascular diseases. This public opinion is supported by mortality statistics of Hungary. The propensity to invest material resources to avoid these diseases has been relatively low. This fact highlights that even today a considerable part of the population takes a fatalistic attitude towards their health condition. According to our results the least worrying diseases are migraine and unbalanced mood, apnoea.

Analysing the intended behaviour of consumers who will pay for prevention, some important differences could be detected. In the second table we show the outcome of regression analysis, which shows the acceptance level of the four different prevention methods.

Table 2: Acceptance of different ways of prevention

<i>Disease</i>	<i>Lifestyle change (expB)</i>	<i>Dietary supplements (expB)</i>	<i>Functional food (expB)</i>	<i>Medicines (expB)</i>
<i>Skin diseases</i>	2,531**	1,674*	1,790**	2,251**
<i>Diabetes</i>	2,179**	1,982**	1,716**	1,380*
<i>Osteoporosis</i>	2,016**	1,129	1,502**	1,796**

<i>Cancer</i>	1,781**	1,437	1,412*	1,775**
<i>Digestion problems</i>	2,279**	1,836**	1,761**	1,012
<i>Unbalanced mood, apnoea</i>	2,047**	2,201**	1,896**	1,047
<i>Joint diseases</i>	1,646**	2,099**	1,469*	1,331
<i>Respiratory diseases</i>	2,648**	2,276**	1,544*	2,181**
<i>Weakened immune system</i>	2,010**	1,955**	1,547**	1,393
<i>High level of cholesterol</i>	2,557**	1,497*	1,810**	1,651*
<i>Concentration problems</i>	1,554**	1,688**	1,597**	1,367
<i>Migraine</i>	1,829**	1,263	1,763**	1,680**
<i>Cardiovascular diseases</i>	2,707**	1,677*	1,68	1,598**

* $p < 0,05$, Wald chi-square; ** $p < 0,01$, Wald chi-square

If we analyse the preferred method of prevention, the most accepted one is the change of lifestyle, but the application of dietary supplements is widely accepted, too. In some cases (e.g. weakened immune system, respiratory diseases) the dietary supplements have a priority in the minds of consumers. According to this, besides knowing that one of the main reasons for the consumption of dietary supplements is disease prevention (Albright, 2012), now we know which diseases the consumers want to prevent by consuming these kinds of products.

It is obvious that there is a relatively high level of acceptance of functional foods in prevention in the case of consumers who are willing to invest into the prevention. The consumption of functional foods is accepted in the case of high level of cholesterol and unbalanced mood, apnoea, concentration problems and migraine, which answers the question given by Siró and colleagues (2008).

The application of medicines are generally accepted in case of cancer, skin disorders and osteoporosis. Presumably, this can be explained by the high level of concern of disease (e.g. cancer). We also have to mention that consuming medicine is the prevention method which divides consumers the most. This might be because when they feel there is no other method they can choose, or they know there is no time for trying something, they will choose medicine.

The number of health related problems, in the case of which there is significant difference between different groups of consumers, is summarised in Table 3.

Table 3: Number of significant differences (from 13 diseases) in application of various ways of prevention across different socio-economic groups of consumers

<i>Variable</i>	<i>Level</i>	<i>Change of lifestyle</i>	<i>Consumption of functional food</i>	<i>Consumption of medicines</i>	<i>Dietary supplement</i>
<i>Gender:</i>	Male	10	2	3	5
	Female	13	10	10	10
<i>Age brackets:</i>	<25	9	2	5	6
	25-35	2	2	2	2
	36-50	10	5	1	4
	50<	11	7	7	4
<i>Place of living:</i>	Budapest	13	6	1	8
	Other city	10	3	8	7
	Village	2	5	4	1
<i>Highest accomplished qualification:</i>	Primary school	6	4	0	1
	Secondary school	12	2	4	5
	Tertiary school	10	10	6	9
<i>Subjective estimation of income position</i>	Below average	10	3	1	2
	Average	13	10	9	7
	Above average	8	2	4	3
<i>It is important for me to do something for my health</i>	Important	13	12	10	10
	Not so/not important	1	1	2	4
<i>I pay</i>	Yes	13	12	9	9

<i>attention to eat healthy food products</i>	No	6	0	3	4
<i>Nutritional status of respondent, based on Body mass index, based on self-reported height and weight of respondents</i>	Undernourished	2	0	1	1
	Normal	12	6	8	7
	O b e s e / overweight	12	9	4	6
<i>Grocery shopper in the household</i>	Respondent	13	13	6	4
	Other person	9	0	4	3
	Shared	7	4	2	8
<i>Presence of children in the household</i>	Yes	10	6	4	3
	No	13	9	6	7

Just as before, the most welcomed solution to disease prevention was change of lifestyle, but in some cases, after this method, consuming functional food was preferred, which makes us think that consumers are getting more and more aware of the positive effects of functional food products. The highest level of acceptance of functional foods as a way of disease prevention has been in the case of women, average income level and higher educated respondents. This result is in line with results of other researchers (Brečić et al., 2014, Yu & Bogue, 2013, Siró et al., 2008) who examined who the consumers of functional food products are. Also, we can say that only those do not prefer consuming functional foods to prevent diseases who are undernourished according to their BMI index, for those who don't really feel like it is important to do something for their health and to eat healthy food products and in those households where someone else is the grocery shopper, but not the respondent. In the prevention of the majority of diseases, functional foods are preferred to medicines.

Contributions to Theory and Practice

Our results show that consumers are most concerned about cancer, and cardiovascular diseases, and the least concerned about migraine and unbalanced mood from the thirteen diseases that we

asked about. These rates are also true when we consider not only the concern, but the question about which disease worry them so much, that they would pay to prevent it.

The most welcome solution to prevent most of the diseases was change of lifestyle, but consuming functional food also seems an acceptable way in most cases. From the consumers' perspective functional food products can play a relevant role in the prevention of high level of cholesterol, unbalanced mood, apnoea, concentration problems and migraine. According to our results these products are relevant for women, for people in the middle class and for those who have higher education. With our research we answered the yet unanswered question given by Siró and colleagues (2008) about which diseases worry consumers, and which would they prevent with nutrition. Our results also show a new aspect to the segmentation of the market, and to the development of functional food products.

Selected References

1. Albright, C. L., Schembre, S. M., Steffen, A. D., Wilkens, L. R., Monroe, K. R., Yonemori, K. M., & Murphy, S. P. (2012). Differences by race/ethnicity in older adults' beliefs about the relative importance of dietary supplements vs prescription medications: results from the SURE Study. *Journal of the Academy of Nutrition and Dietetics*, 112(8), 1223-1229.
2. Atkins, R. C. (2005). The changing patterns of chronic kidney disease: the need to develop strategies for prevention relevant to different regions and countries. *Kidney International*, 68, S83-S85.
3. Bagchi, D., & Nair, S. (Eds.). (2016). *Developing New Functional Food and Nutraceutical Products*. Academic Press.
4. Bailey, R. L., Fulgoni III, V. L., Keast, D. R., & Dwyer, J. T. (2011). Dietary supplement use is associated with higher intakes of minerals from food sources—. *The American journal of clinical nutrition*, 94(5), 1376-1381.
5. Bailey, R. L., Fulgoni, V. L., Keast, D. R., & Dwyer, J. T. (2012). Examination of vitamin intakes among US adults by dietary supplement use. *Journal of the Academy of Nutrition and Dietetics*, 112(5), 657-663.
6. Beaglehole, R., & Yach, D. (2003). Globalisation and the prevention and control of non-communicable disease: the neglected chronic diseases of adults. *The Lancet*, 362(9387), 903-908.
7. Boutayeb, A., & Boutayeb, S. (2005). The burden of non communicable diseases in developing countries. *International journal for equity in health*, 4(1), 2.
8. Brečić, R., Gorton, M., & Barjolle, D. (2014). Understanding variations in the consumption of functional foods—evidence from Croatia. *British food journal*, 116(4), 662-675.
9. De Nooijer, J., Jansen, R., & Van Assema, P. (2012). The use of implementation intentions to promote vitamin D supplementation in young children. *Nutrients*, 4(10), 1454-1463.
10. Mendis, S. (2014). Global status report on noncommunicable diseases 2014. World health organization. <http://apps.who.int/iris/bitstream/handle/>

10665/148114/9789241564854_eng.pdf;jsessionid=1211744553416E35D347B082B97DA970?sequence=1 (01.05.2017)

11. Siró, I., Kápolna, E., Kápolna, B., & Lugasi, A. (2008). Functional food. Product development, marketing and consumer acceptance—A review. *Appetite*, 51(3), 456–467.
12. Starr, R. R. (2015). Too little, too late: ineffective regulation of dietary supplements in the United States. *American journal of public health*, 105(3), 478-485.
13. Szakály Z. (2009). Egészségmagatartás és funkcionális élelmiszerek: hogyan vélekednek a hazai fogyasztók?. *Élelmiszer, táplálkozás és marketing*, 6(1-2.).
14. Szakály, Z., Berke, S., Biacs, P., Szakály, S., Széles, G., Szente, V., & Szigeti, O. (2010). Funkcionális élelmiszerek piaci helyzetének vizsgálata= Market analysis of functional foods. *OTKA Kutatási Jelentések| OTKA Research Reports*.
15. Van Kleef, E., Van Trijp, H. C. M., & Luning, P. (2005). Functional foods: Health claimfood product compatibility and the impact of health claim framing on consumer evaluation. *Appetite*, 44, 299–308.
16. WHO (2014): Noncommunicable Diseases (NCD) Country Profiles; http://www.who.int/nmh/countries/hun_en.pdf?ua=1 (01.05.2017)
17. WHO (2016): World Health Statistics 2016: monitoring health for the SDGs, sustainable development goals, WHO Press, Geneva
18. Yu, H., & Bogue, J. (2013). Concept optimisation of fermented functional cereal beverages. *British Food Journal*, 115(4), 541-563.

Future Directions Pertaining To Food Security

Renée Shaw Hughner

Abstract

Food Security is defined as “the condition in which all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (United Nations' Committee on World Food Security). Literature spanning the past four centuries has examined the multi-faceted issue of food security. Literature from the early 1600s notes policy makers’ concern over the poor having adequate access to food, as well as the need to more efficiently breed fowl and cattle and to make wise use of land (Standish 1611). Over time researchers have continued to focus on certain disadvantaged segments of the population (e.g., lower income, rural, and working class consumers) and their struggle to access nutritious food. Additionally, research on food security has expanded to include consideration of food systems located in difficult environments (e.g., drought, war). As we entered into the second millennium, more researchers began to again ponder issues of food system sustainability to provide for a burgeoning world population, estimated to grow to nearly 10 billion people by 2050. The questions of adequate methods and systems to provide access to nutritious foods to all people, in various contexts, persist. Additionally, issues of climate change and sustainability provide new considerations for food security. The Food and Agriculture Organization (FAO) of the United Nations lists ten challenges to existing food systems around the world. Included in these challenges are the issues of sustainably improving agricultural productivity to meet increasing demand; ensuring a sustainable natural resource base; addressing climate change; eradicating extreme poverty and reducing inequality; and making food systems more efficient, inclusive and resilient (FAO 2017). The goal of this session is to discuss the various facets of food security, with the goal of gleaning participant insight as to how the Journal of International Food and Agribusiness Marketing can best contribute to the food security body of literature.

Product-country image and crises in the Spanish horticultural sector

M. Mar Serrano-Arcos, Juan Carlos Pérez-Mesa & Raquel Sánchez-Fernández

Abstract

Introduction

In the last 50 years, the South of Spain has become the principal horticultural supplier within Europe. 40% of the vegetables consumed in Europe come from Spain. Hence, Spain is considered as the main European manufacturer (5,206 million euros, 72% of all production), mainly in the European Union market. The consumer purchases these products, 70% at least (Pérez-Mesa and Galdeano, 2015), in commercial establishments from huge distribution chains (e.g., Aldi, Carrefour, Edeka, Tesco). It should also be noted that European end consumers purchase a similar percentage of vegetables from these same retailers. These retailers have particularly high production quality standards they demand from their producers including, among other things, environmentally sustainable practices, high product quality technical standards, and socially sustainable strategies. These practices have been strengthened by various factors, including the incidence of food safety crises, potential food risks from chemical use in food production, and related risk communication or the lack thereof (Nguyen, 2017).

Nonetheless, many consumers and the mass media ignore the efforts so far taken by producers at origin in order to fulfil their negotiated commitments with their clients, resulting in an asymmetry of information between producers and consumers. Therefore, despite the efforts, the Spanish horticultural sector's image has been affected by recurring crises arising from two main sources. First, the ineffective management of problems common to the Spanish horticultural sector, such as: i) bad social conditions for immigrant workers (Pumares and Jolivet, 2014; Medland, 2016); ii) environmental degradation (Grindlay et al., 2011; Juntti and Downward, 2017); and iii) the excessive use of fertilisers and pesticides, resulting in low-quality production and consumption (Wainwright et al., 2014). Second, the erroneous accusations originating both in Spain and other countries (mainly through mass media) wrongly claiming an outbreak of *Escherichia Coli* identified by Germany, originated in Spanish cucumbers (Lopes et al., 2013).

Apparently, European end consumers have placed a great deal of importance on the crises that have occurred in the Spanish horticultural sector. However, no previous studies have analysed these critical events in a structured manner. Previous literature has only focused on the implications of consumer's risk perception on food purchase decisions (Böcker and Hanf, 2000; Dosman et al., 2001; Wandel and Fagerli, 2001). Specific studies on horticultural consumers' perceptions are scarce (Kreab, 2015). Following Cheng et al. (2016), consumer studies on purchase behaviour and safety concern are necessary to help the food industry to control product safety and quality. Consequently, the main objective of this study is to determine and classify the origin and characteristics of the negative campaigns responsible for damaging the sector's image, and to determine its impact on the European market under an exploratory approach.

The outline of the paper is as follows. First, a literature review on the country of origin effect and the concept of product-country image is done (e.g. Roth and Diamantopoulos, 2009; Samiee, 2010; Cilingir and Basfirinci, 2014). Furthermore, this research provides a conceptual framework to analyse the notion of 'crisis' (Bessant, 2007). Then, the paper explores the different sources and origins of this phenomenon in order to provide a typology and a classification of crises in this sector, analysing, in particular, the main negative campaigns in the case of the Spanish horticultural sector. The methodology section is presented then, with the rationale for adopting an exploratory approach, and a description of the method and the data collection. Finally, results are discussed, and conclusions are offered for the possible implications to management and the orientation of future research.

Methodology

It is conducted an exploratory analysis, as a preliminary study to know the impact of those crises on the perceived product-country image, considering the main destination markets in Europe. More specifically, the analysis aims to: 1) explore the consumers' knowledge about the origin of the product using a questionnaire made *ad hoc*; 2) obtain information regarding the level of knowledge that end consumers have of the horticultural production system, as well as to what extent this knowledge affects their consumption and their product-country image; 3) identify the kind of campaigns consumers associate most frequently with the Spanish horticultural sector. Finally, a Logit model is used to explore the impact that the degree of knowledge on the sector and the news about it have on the consumption of Spanish horticultural products.

Results

The analysis shows the aforementioned issues. Most consumers could know that they buy vegetables from Spain; however, 50% of them would have no knowledge about the production system in use. The most popular types of horticultural news that would reach consumers are those focused on the environment and social impact, as well as those that emphasise poor food quality. The results also reflect that negative news could have a measurable and significant impact on the consumption of vegetables. In contrast, having knowledge about the production system could have proven to have a positive influence. It must be noted that the survey conducted should be viewed as a preliminary market analysis that will have to be improved to confirm the generalisation of the results.

Conclusions

The Spanish horticultural sector has been subject to constant image crises. Mistakes committed by the sector in the past and a failure to address identified problems have had negative consequences on the image of the sector, a fact made evident by the release of negative news in the national and foreign media as social triggers. However, as the present work has shown, some of the crises have their origins in a previous negative conception or, in some cases, from a lack of knowledge on the part of consumers regarding the efforts made by the Spanish horticultural production and marketing sector in its attempt to improve quality and safety throughout its supply chain.

In sum, it can be seen that there is a need to take action, which must be coordinated from the origin, in order to reach consumers and restore the prestige of the production system. Initiatives in this line would eliminate the asymmetry of information between production and consumption areas. These proactive information campaigns must give priority to measures implemented for the purpose of increasing social and environmental sustainability, and, in the latter case, to emphasise the use of new production systems that feature biological control. As for consumer perception of poor social conditions, this is a complicated issue to solve, as it is the product of a combination of more general problems, which are actually exogenous to the sector itself.

References

- Bessant, K. C. (2007). "Multiple discourses on crisis: Farm, agricultural, and rural policy implications". *Canadian Journal of Agricultural Economics*, 55(4): 443-457.
- Cheng, L., Jiang, S., Zhang, S., You, H., Zhang, J., Zhou and Wang, X. (2016). "Consumers' behaviors and concerns on fresh vegetable purchase and safety in Beijing urban areas, China". *Food Control*, 63: 101-109.
- Cilingir, Z. and Basfirinci, C. (2014). "The impact of consumer ethnocentrism, product involvement, and product knowledge on country of origin effects: An empirical analysis on Turkish consumers' product evaluation". *Journal of International Consumer Marketing*, 26(4): 284-310.
- Dosman, D. M., Adamowicz, W. L. and Hrudey, S. E. (2001). "Socioeconomic determinants of health-and food safety-related risk perceptions". *Risk analysis*, 21(2): 307-318.
- Grindlay, A. L., Lizárraga, C., Rodríguez, M.I. and Molero, E. (2011). "Irrigation and territory in the southeast of Spain: evolution and future perspectives within new hydrological planning". *WIT Transactions on Ecology and the Environment*, 150: 623 – 637.
- Juntti, M., and Downward, S. (2017). "Interrogating sustainable productivism: Lessons from the 'Almerían miracle'". *Land Use Policy*, 66: 1-9.
- Kreab (2018). "Estudio de percepción: agricultura intensiva". Plataforma tecnológica de agricultura sostenible.
- Lopes, F., Ruão, T., Marinho, S. and Araújo, R. (2013). "Escherichia coli: a disease in the news through speeches of uncertainty and contradiction". *International Journal of Healthcare Management*, 6(1): 51-62.
- Medland, L. (2016). "Working for social sustainability: insights from a Spanish organic production enclave". *Journal Agroecology and Sustainable Food Systems*, 40(10): 1133-1156.

Nguyen H.D.M., Rutsaert, P., Van Loo, E.J. and Verbeke, W. (2017). “Consumers’ familiarity with and attitudes towards food quality certifications for rice and vegetables in Vietnam”. *Food control*, 82: 74-82.

Pérez-Mesa, J.C. and Galdeano, E. (2015). “Collaborative firms managing perishable products in a complex supply network: An empirical analysis of performance”. *Supply Chain Management*, 20(2): 128-138.

Roth, K. and Diamantopoulos, A. (2009). “Advancing the country image construct”. *Journal of Business Research*, 62: 726–740.

Samiee, S. (2010). “Advancing the country image construct—a commentary essay”. *Journal of Business Research*, 63(4): 442-445.

Wainwright, H., Jordan, C., and Day, H. (2014). “Environmental Impact of Production Horticulture”. In *Horticulture: Plants for People and Places*. Springer: 503-522.

Wandel, M., and Fagerli, R. A. (2001). “Consumer concern about food related health risks and their trust in experts”. *Ecology of food and nutrition*, 40(3): 253-283.

Millennials Attitudes Towards Traditional Cuisine in Rural Travel Destination

Cerjak, M., Mesić, Ž., Tomić, M.

Abstract

Modern tourists are looking for an authentic experience when visiting a tourist destination including tasting of local food. Therefore, food become an important subject to researchers in the field of tourism and food service. Recently, there is a growing interest in the generation of Millennials' including their role as tourists. Hence, it is interesting to investigate their perception of traditional cuisine as a touristic attraction. The aim of this study was to explore Millennials' attitudes towards traditional cuisine and their food behaviour when visiting rural travel destinations.

In order to collect primary data a survey was conducted with 162 persons aged between 19 and 35 years. In the sample prevail females, those living in urban areas and persons with finished university education. Three fourth of the respondents visited some agritourism farm 1-5 times in the last five years.

Using factor analyses followed by cluster analyses we divided millennial respondents in three distinctive segments based on their general food behaviour and attitudes: health oriented consumers, convenient consumers, food lovers. The only difference between segments regarding their socioeconomic characteristic is found in regard to their place of living (more convenient consumers live in urban areas compared to other two segments).

All respondents showed high appreciation of traditional cuisine. Health oriented consumers and food lovers showed very similar attitudes; they strongly believe that traditional cuisine represents a touristic attraction and that it is an important element of rural cultural heritage. Great majority of them claimed to always order traditional cuisine when visiting agritourism farms/ rural restaurants. On the other hand, convenient consumers consider traditional cuisine significantly less important as other two segments.

All consumers consider a good cuisine as an important attribute in choice of rural destination especially health oriented consumers and food lovers who are ready to return to a destination if they were satisfied with the food offer. Additionally, health oriented consumers are more interested to participate in food preparation in agritourism farms than other consumers and together with food lovers they are very interested in gastro tourism. Consumers from these two segments like to get information about gastronomic offer before travelling but food lovers take more into account gastro image of the destination and their earlier experience with the food in the destination. On contrary, convenient consumers pay less attention to food recommendations in a rural destination and they are more price sensitive when buying traditional meals.

The results of this research could be useful for rural tourism stakeholders in targeting millennials tourists.

Exploring Consumers' Sensory Evaluation And Intention To Buy Salt-cured Clipfish

Svein Ottar Olsen, Kåre Skallerud, Morten Heide

Abstract

The Norwegian clipfish industry are looking for opportunities to differentiate their products in order to adapt to different consumer preferences and increase product values and willingness to pay. Curing and aging of the raw material is a way to increase flavour, uniqueness and value of different food and drink products like ham and wine. For example, it takes up to 36 months to produce different qualities of Spanish ham like Jamón Ibérico de Bellota. The aim of this study is to test consumer's sensory evaluation, intention to buy and willingness to pay for traditional salt-cured (5 weeks) versus long-time salt-cured (6 months) clipfish from cod without information about the products.

A total of 117 subjects between 18 and 77 years (43% female; 67% male) were recruited to participate in a central location test in Tromsø (Norway). Participants were randomly assigned in two groups (between-group design) and the test were conducted individually without social interactions between participants. A clipfish meal was served to the participants in order to create a more realistic meal setting. Meal components were clipfish, potatoes, pea purée and bacon vinaigrette. Participants were asked to evaluate the "meal" on important sensory attributes (e.g., taste, texture, colour, and smell), overall satisfaction, perceived uniqueness, intention to buy, willingness to pay and some individual traits like nostalgia and interests in traditional food.

There was a significant difference in mean values between the two groups for sensory attributes like colour and salty taste, as expected. However, there was no differences in the mean value of general liking / satisfaction for the two different products / meals. Using structural equation modelling, we found that the long-time cured product developed a separate dimension of perceived uniqueness (unique, original and unusual) which contributed to explain more variance in consumer satisfaction. As expected, it was a positive relationship between satisfaction and intention to buy and willingness to pay. This study contribute to the existing literature of traditional food (e.g., Pieniak et al., 2009) to indicate that general nostalgia (e.g., Wildschut et al., 2006) influence involvement in traditional food. Interestingly, the relationship between involvement for traditional food and perceived uniqueness for the cured clipfish was also significant. Thus, our findings suggest that some consumer have high preferences for long-time cured clipfish, but others prefer traditionally cured clipfish with milder taste. The potential for product development and product positioning of cured attributes is positive. Future research should be extended to test if and how product and process information in different forms (e.g., no. months cured) further stimulate consumer values, satisfaction, buying intentions and willingness to pay for cured clipfish.

References

Pieniak, Z., Verbeke, W., Vanhonacker, F., Guerrero, L., & Hersleth, M. Associations between traditional food consumption and motives for food choice in six European countries. *Appetite*, 53: 101-108.

Wildschut, T., Sedikides, C., Arndt, J. & Routledge, C. (2006). Nostalgia: content, triggers, functions. *Journal of Personality and Social Psychology*. 91 (5): 975-993